



# Another Dozen Sustainability Case Studies

These 12 case studies and best practices follow the 36 sustainability programs featured in the March/April issue. We received such a wealth of wonderful program descriptions that we had to share a few more here in *Facilities Manager*. And yet, these programs represent the tip of the iceberg of the width and breadth of advancements in campus sustainability and stewardship. An excellent resource to visit, and contribute to, is the Campus Sustainability Hub developed by AASHE, the Association for the Advancement of Sustainability in Higher Education. You can search topics and submit your own resource by visiting <https://hub.aashe.org>.

APPA will be publishing a collection of the 100+ case study submissions we've received over the past three years into a new epublication. Contact Steve Glazner at [steve@appa.org](mailto:steve@appa.org) for more information. In the meantime, we hope you enjoy reading these dozen best practices.

■ ■ ■ ■ Compiled by Steve Glazner

## ARIZONA STATE UNIVERSITY

Tempe, Arizona

*Submitted by Susan Norton, Program Manager, University Sustainability Practices*

### ORANGE MALL EXPANSION SUBMITTED FOR SUSTAINABLE SITES

**Project Size:** 1.9 acres

**Project Type:** Institutional / Educational

**Site Context:** Urban

**Former Land Use:** Brownfield

**Terrestrial Biome:** Desert

**Budget:** \$3,000,000

As a commitment to the university's overall sustainability goals, Orange Mall Expansion is the first landscape-based project submitted for Sustainable SITES certification. Located in the core of ASU's Tempe Campus, the project replaces a former section of roadway and cul-de-sac with a new pedestrian mall and multi-use plaza for programmed events and informal social gatherings



by students, faculty, and staff. Developed in concert with the adjacent LEED Platinum and emerging Net Zero Student Pavilion, the project utilizes low-impact development (LID) techniques to create an integrated sustainable design solution for both building and site. Connected runnels transfer collected building condensate and stormwater from on-site to a series of planted bioswales and a rain garden for infiltration and as supplemental irrigation. Excess stormwater flows to a second infiltration gallery for use as groundwater recharge. Students will be actively involved in the ongoing monitoring of several site performance factors including stormwater quality and flow rates along with monitoring of space utilization and social interactions. ■■■■



## BEMIDJI STATE UNIVERSITY

Bemidji, Minnesota

*Submitted by Anna Carlson, Assistant Sustainability Director*

### COLLABORATIONS WITH THE AMERICAN INDIAN RESOURCE CENTER

Bemidji State University is located in between the three largest Native American reservations in the state of Minnesota. BSU is launching both innovative academic programming as well as an on-campus solar installation in collaboration with the campus' American Indian Resource Center. BSU has developed a novel sustainability model that integrates indigenous and wellness perspectives with the understanding that we are dependent on the Earth to live and thrive.

The Gwayakochigewin (GWAY-ah-ko-chee-GAY-win) Collaborative named after an Ojibwe word which means "making things right"—was launched in January 2018—and joins the

university's Office of Sustainability, American Indian Resource Center, and Department of Languages and Indigenous Studies to create a unique co-curricular program that will fold traditional viewpoints into a modern view of sustainability.

The American Indian Resource Center is also working with the university's Sustainability Office to design and install a 36.3 kW solar carport system in the AIRC parking lot. The planned solar project includes commissioning native artists to create designs that will wrap the posts of the solar installation. These elements will further infuse the indigenous cultural values that guide the university's sustainability efforts into visible and educational projects for the campus and broader community. ■■■■





## CALIFORNIA STATE UNIVERSITY SAN MARCOS

San Marcos, California

*Submitted by Juliana Goodlaw-Morris, Sustainability Manager, and Cai Steffler, Environmental Health & Occupational Safety Specialist*

### ELIMINATING BIOLOGICAL WASTE TO THE LANDFILL

The Emerald Energy Program is an innovated alternative method for the disposal of biohazardous waste. Typically, biohazardous waste is treated in an autoclave and sent to a landfill for burial and disposal. Autoclaves are notorious for using thousands of gallons of water a day and being energy intensive. The Emerald Energy Program is a more sustainable practice for this laboratory waste stream than traditionally managed in the past. This program diverts waste from the landfill to an incineration facility in California.

The process of incineration leads to thermal energy, which



then helps to power the local power grid. In 2017, CSUSM generated approximately 2645.5 kWh of electricity and diverted 4,810 pounds of waste using this program. This is enough energy to power one home for an entire year. In addition to Emerald Energy being a sustainable solution, there are many other benefits to utilizing the program, including reduced liability, reduced need for compliance reporting and tracking, and extended storage holding time. Due to the success of the program, CSUSM will be expanding the program to include biological safety level 2 waste

as well. As of 2018, CSUSM will not be autoclaving and landfilling any of our biohazardous waste. ■■■■



## GEORGIA COLLEGE & STATE UNIVERSITY

Milledgeville, Georgia

*Submitted by Lori Strawder, Chief Sustainability Officer*

### INCREASING AWARENESS AND REDUCING FOOD WASTE!

Food waste and food insecurity are real issues not discussed as much as they should be and solutions to these issues are readily available. Students at Georgia College are learning about these issues and have found one way to eliminate food waste being sent to the landfill as well as educate other students about and on the impact of their actions.

The compost project, a student-led project, began in 2016 with assistance from the Office of Sustainability, Sustainability Fee Program, Facilities Operations, Facilities Planning, and Dining Services. In the fall of 2017, students performed a food waste weigh-in at the Dining Hall, where students intercepted other



student's plates and scraped their food waste into compost bins right in front of them.

This event gave students the opportunity to educate their peers about how much food was being wasted and how families are affected by food insecurity. The food waste collected, during a two-hour span, generated 95 pounds of waste, which was taken to the compost site for processing. In fall 2017, the compost project diverted over 5,000 pounds of food waste from the landfill. ■■■■



## GRAND VALLEY STATE UNIVERSITY

Allendale, Michigan

*Submitted by Terry Pahl, Facilities Engineer/Energy Manager*

### AVOIDING A TRAP: AUTOMATING STEAM TRAP FAILURE DETECTION

When it comes to energy conservation the best method, unequivocally, is to not use or waste the energy in the first place. Large steam systems with miles of piping and hundreds of steam traps are particularly subject to wasted steam and significant costs due to timely detection of steam trap failures. In addition to the cost in steam loss there are additional costs in labor and resources used in periodic inspections for trap failure.

GVSU automated the detection of the failed steam traps by installing a SteamEye system developed by Armstrong. SteamEye uses a radio frequency wireless transmitter mounted on the steam trap to detect temperature and ultrasonic fluctuations in steam flow. A central receiver then alerts system operators of



trap failure. Since it is operating 24/7 it can provide real-time trap failures and is more efficient when considering labor costs and safety issues of monitoring by manual means. The project cost was approximately \$250,000 with an estimated \$130,000 in annual savings.

In the past 15 years GVSU has reduced natural gas consumption by 35 percent on a square foot basis. No doubt the many energy conservation measures the university has undertaken, including the introduction of SteamEye, have all contributed to this reduction. ■■■■



## JOHNSON COUNTY COMMUNITY COLLEGE

Overland Park, Kansas

*Submitted by Jay Antle, Ph.D., Executive Director, Center for Sustainability*

### COMPOSTING RESTROOM PAPER TOWELS

JCCC has a Zero Waste to Landfill by 2025 goal. A waste audit involving students identified restroom paper towels as a substantial source of waste on campus. A restroom paper towel composting pilot was put into place in two buildings in March 2017, and then five more buildings by August for a total of 50 restrooms. Housekeeping



staff uses trash smashers to pack the towels, and moves them when bags are completely full. Bags are collected in carts at trash compactor locations and aggregated by student interns. Expansion throughout 2018 should divert an estimated 20 tons of material every year. The towels are then sent to a local commercial composting facility. Paired bins of Compost/Landfill near the entrance to the restroom where most successful in avoiding contamination.

Because restrooms are used by everyone on campus, they provide a great opportunity for education about composting. Posters showing the “Life Cycle of a Composted Paper Towel” accompany bins in restrooms where paper towel composting is available. Feedback has been very positive and, when surveyed, students mention it as one of the most noticeable sustainable initiatives on

campus, which then leads students to learn more about other sustainability programs on campus. ■■■■



## NEW JERSEY CITY UNIVERSITY

Jersey City, New Jersey

*Submitted by Patrick M. Bartole, CAFM, Automotive Fleet Manager*

### ELECTRIC VEHICLE (EV) CHARGING STATIONS

NJCU recently installed a level two (five-charger) Electric Vehicle Charging Station on campus. The EV program is for employees and students who own or lease electric or plug-in hybrid vehicles used for commuting to and from the NJCU campus. Participants are required to complete the electric vehicle charging station and parking registration form and provide a copy of their electric vehicle's registration. Knowing that NJCU has a place to plug in and recharge electric vehicles should assist and inspire our employees and students to consider the purchase or lease of an electric vehicle. The five dedicated EV parking spaces that will be available on a first-come, first-serve basis. NJCU's



goal is to be environmentally friendly by motivating our employees and students to drive green vehicles.

The system has demand response and load management features. In order for participants to use the NJCU electric vehicle chargers, they must obtain an authorization code from Fleet Management to enter into the EV charger keypad, or drivers can opt to download an app to their smartphones. Under the leadership of Facilities & Construction Management, NJCU plans to install additional EV charging stations for fleet usage and to replace some gasoline vehicles with electric vehicles for security patrol and mail deliveries. ■■■■



## SMITH COLLEGE

Northampton, Massachusetts

*Submitted by Matt Pfannenstiel P.E., Energy Manager*

### MODERNIZING INDOOR TRACK HVAC EQUIPMENT

Smith College partnered with GreenerU to modernize and optimize aging HVAC equipment and controls at the college's indoor track and tennis facility. Starting with a building energy audit and integrating the electrical meters into Skyspark, GreenerU outlined several energy conservation measures that formed the basis for a project that retired deferred maintenance, improved system reliability, and ultimately saves us money. The project included new variable frequency drives (VFDs) on previously constant volume heating and ventilation units, new flow-measuring stations for outdoor air, and a pneumatic to direct digital control (DDC) conversion. The above, tied together with an updated air handling unit (AHU) sequence of operations has enabled a reduction in both steam and electrical usage without sacrificing air quality or thermal comfort in the building.

By monitoring space pressure we were also able to shut down or modulate equipment that previously operated continuously and with unnecessarily high steam and electrical usage. The optimized scheduling and equipment operation has reduced energy use while maintaining a reliable and comfortable environment for the diverse groups that use the facility. Throughout the project, GreenerU has continued to be helpful diagnosing and managing the system deficiencies including faulty actuators, problematic freezestats, and poorly located space temperature sensors. ■■■■







## UNIVERSITY OF CALIFORNIA RIVERSIDE

Riverside, California

*Submitted by Peter Byrley, Graduate Student Sustainability Liaison and UC Climate Neutrality Fellow*

### GRADUATE STUDENT GREEN GRANTS PROGRAM

Because of intense research schedules and a general lack of time, graduate students are often a forgotten part of the fight to make campuses more sustainable. In order to make it easier for graduate students to get involved, a pilot grant program was created by the Graduate Student Association of the University of California, Riverside in 2017 to target this population. Grants were created specifically for graduate students to complete on-campus projects that tackled sustainability issues and raised awareness of sustainability concepts.

Graduate students were encouraged to submit a detailed proposal to the Graduate Student Association, where it went through two rounds of evaluation by a committee. Eventually,

11 projects were funded at a grand total of \$8,000 dollars using reserve Graduate Student Association funds over the winter and spring quarter. Projects ranged from raising awareness on campus through a “Sustainability 5K” run, teaching students and staff how to make cleaners out of natural ingredients through an on-site class, and conducting a study of wind patterns across campus through the implementation of small wind turbines.

This program, the first of its kind, involved over 40 graduate students and provided a rewarding resume building experience outside of typical graduate education. ■■■■



University of Colorado  
Boulder

## UNIVERSITY OF COLORADO BOULDER

Boulder, Colorado

*Submitted by Christina Greever, CU Green Labs Program Assistant; Kathy Ramirez-Aguilar, CU Green Labs Program Manager; Theresa Nahreini, Cell Culture Facility Manager*

### SHARED CELL CULTURE FACILITY PROVIDES HEFTY COST AVOIDANCE

University laboratories are large consumers of resources including energy, water, material goods, chemicals, and space, and therefore present tremendous opportunity for reducing the environmental and fiscal footprint of research. Scientists are also currently experiencing intense competition for research funding so efficiency and cost-saving measures benefit both the scientist and the institution. The CU Green Labs Program has been studying our Biochemistry Cell Culture Facility as a successful example of shared equipment in collaborative research space that could be emulated elsewhere. Our resulting case study demonstrates that the Biochemistry Cell Culture Facility—which is utilized by 16 laboratories and 80 individuals across three departments—results in substantial cost avoidance, a smaller en-



vironmental footprint, and is beneficial to the culture of science on our campus.

A key ingredient is a high-quality manager. We estimate that the facility is providing a cost avoidance of over \$265,000 per year to CU Boulder, with \$194,000 per year of those avoided costs realized directly by scientists and Biochemistry, and \$71,000 per year realized by campus management. Review our case study for a deeper look into the numerous social, environmental, and fiscal benefits of such a shared facility: [www.colorado.edu/ecenter/greenlabs/case-study-biochemistry-cell-culture-facility](http://www.colorado.edu/ecenter/greenlabs/case-study-biochemistry-cell-culture-facility) ■■■■



## UNIVERSITY OF KENTUCKY

Lexington, Kentucky

*Submitted by Britney Ragland, Energy Engineer for Utilities Services and Energy Management*

### PARTNERING TO EXPAND RENEWABLE ENERGY AND CONNECT FACILITIES OPERATIONS TO THE CLASSROOM

In the spring of 2013, a graduate-level electrical engineering class conducted a solar feasibility analysis of the UK campus. They identified the roof of the R.G. Anderson Building as a low-cost, high-output opportunity. The work of the students in this course led directly to a 2015 partnership between Facilities Management and the Student Sustainability Council to co-fund a 56 kW array on the roof. This array, completed in spring 2016, is the largest of three solar PV installations on our campus and includes a web-based monitoring system that provides (near) real-time details on power production.

The system produces approximately 3 percent of the annual



demand of this large teaching and research building—enough power for 3-4 average homes. The estimated payback on the approximately \$190,000 installation is just over 20 years, but with the students' funds considered as an incentive program, the physical plant's investment has a 10-12 year financial payback with the added benefit of providing students with new learning tools. "Not only will the facility help power one of our buildings, it will also be a great teaching tool for our students," praised the Dean of the College of Engineering at the outset of the project. ■■■■



## UNIVERSITY OF TEXAS AT AUSTIN

Austin, Texas

*Submitted by Kristin Elise Phillips, Communications Coordinator, Office of Sustainability*

### A NEW PURPOSE FOR CAMPUS TREES

What used to be mulched is now turned into a lovely spot to eat lunch, take a phone call, or study at the University of Texas at Austin. Since 2014, trees harvested on campus are repurposed through a collaboration among the landscaping team, the Carpenter Shop, and the Sign Shop. Felled trees are milled, stored, and dried until Armando Blanco and his team of master carpenters select wood to build a highly unique piece of furniture. "The wood tells us what to do, to make a bench or a picnic table," says Blanco. "This is a fun project for the Carpenter Shop, and it is evolving because more and more people are requesting furniture to fill empty spots on campus." The new furniture—each piece graced with a sign touting the species and location of the tree



from which it was made—enlivens many spaces on campus, from the cavernous School of Nursing Courtyard to a reflective spot in the new native plant garden. Most recently, Blanco delivered a bench to the Office of Sustainability made from cedar elm. Always trying something new, he had inlaid bits of turquoise into a natural crack in the wood. ■■■■

These case studies were compiled by Steve Glazner, editor of *Facilities Manager*, who can be reached at [steve@appa.org](mailto:steve@appa.org).