



PennState

SUSTAINABILITY WORK PLAN

2018–2021

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Executive Summary

Penn State's Sustainability Institute was founded out of a comprehensive two-year planning effort to become a leader of sustainability in higher education and has now been operating for the past five years. It brings together experience, talent, values and a work ethic of sustainability to the university in its key operational areas including education, research, and service for advancing the institution as a sustainable solutions driven University.

Our Commitment to Impact, Penn State's Strategic Plan for 2014-2018 embraces sustainability in the broadest possible sense: not only environmental, but also social, organizational, financial, and operational sustainability. All these dimensions of sustainability are important if Penn State is to prosper and effectively address sustainability challenges of the Anthropocene and meet the globally agreed-upon UN Sustainable Development Goals. The plan commits us to stewarding our natural resources, enhancing the health and well-being of our communities, transforming education, driving digital innovation, and advancing the arts and humanities, all of which are essential components in graduating sustainability leaders of the future.

Our Sustainability Work Plan articulates direction, programs and activities for accomplishing the above aspirations. The plan seeks to establish sustainability as a basic function within the University. We imagine sustainability activities to be owned and implemented by all units - 13 Colleges, 24 Campuses, multiple operational units, and engaged with communities across Pennsylvania. The plan encompasses curriculum, research, student life, and community engagement, making Penn State a vehicle for achieving sustainability across Pennsylvania, and beyond. This will happen only through partnership and engagement of students, faculty, staff, administration, and communities.

The work plan includes systemic changes and interrelated programs in six work areas: Curriculum and Teaching activities to increase the number of sustainability courses and students' sustainability literacy; Student Life and Co-Curricular Learning that allows students to live into sustainability values, culture and practices; Sustainability Solutions Research that helps to extend the concept of "Campus as a Living Lab for Sustainable Solutions", as well as encourages undergraduate research and global engagement; Sustainable operations across all of our Finance and Business operating services; Community Outreach and Engagement to build local capacity to implement sustainable solutions; Administration and Communications of sustainability to internal and external stakeholders. We will take steps to increase synergies between units, and to be mindful of tradeoffs, by analyzing each initiative, designing appropriate organizational structures and processes, assessing needed resources and capacity to change, and committing to greater communication on the initiatives.

Resourcing this plan emphasizes the need for putting resources into each College, Campus and Operating unit so that sustainability can be owned by the respective units. The Sustainability Institute's role is to coordinate, co-initiate, consult, coach, and train the operating units on sustainability issues. This work plan is a living document intended to lay out our path forward for the Penn State community to consider collectively. We invite comments and suggestions to strengthen the plan and allow us to reach our vision as a University. We will be looking for feedback and participation, and anyone passionate about sustainability is encouraged to reach out to help shape our future.

Penn State is well on the road to being a leader in sustainability, yet the road ahead holds more challenges at the local, state, and global levels. By pursuing the goals and priorities we collectively set, we can bring sustainability to all our campuses, communities and the entire state of the Pennsylvania.

Sustainability and Ethics

Penn State is committed to ethical behavior in research, honesty and integrity in academics, protecting children, and creating a diverse, inclusive and safe work place for all. Sustainability may be viewed as a specific expression of ethics reflected in our duty to address the impact of our actions on future generations, other species and the environment on which all life depends. Ethical decision making is recognized as a core competency of sustainability (references inserted here) in particular with regard to our obligations to future generations and to other species, balancing competing demands and managing trade-offs. Similar to workplace ethics training that warns of the need to avoid potential conflicts of interest or a duty to report child endangerment, sustainability programs create daily opportunities for the Penn State community to live up to the high ethical standards that oblige us to think not only of ourselves, but of others, and to make decisions in our daily lives and habits that meet our needs today while enhancing the ability of future generations to meet their own needs.

Indeed, the founding document from which the Sustainability Institute was created, articulated a set of foundational principles, the first of which is the “recognition of the fundamental ethical right of all human beings, both now and in the future, to basic needs such as healthy food, clean water, dependable healthcare, a living wage, and an affordable education.” Operationalizing ethics through sustainability (or sustainability as ethical behavior) begins with recruiting and hiring a diverse workforce who share our values, providing students an opportunity to internalize these values through the curriculum and co-curricular experiences, setting goals and tracking our performance with respect to key indicators, using evidence to inform our policies, and collaborating with campuses, colleges and departments across the institution to achieve the fullest expression of our ethical obligation to build a more sustainable Penn State and world. It is in that vein that the Sustainability Institute offers this plan.

I. Introduction and Overview

The Sustainability Institute was established five years ago by merging the former Center for Sustainability and Campus Sustainability Office. During its initial phase, it launched many pilots and initiatives intended to fulfill the mission of integrating sustainability into all of the University's functions:

- teaching and curriculum,
- research,
- student engagement,
- outreach,
- operations.

These include the Sustainability Leadership Minor through the College of Health and Human Development; the Eco-Reps program within Residence Life; the Sustainable Communities Collaborative in collaboration with Outreach and Online Education and instructors of more than 30 courses in 11 colleges; the Green Paws program that engages more than 2,000 faculty and staff through certification of 200 offices; 73 active Green Teams in different departments; the Reinvention Fund that funded 33 sustainability projects at University Park and seven Penn State Campuses; and the Student Farm and the Sustainable Food Systems Program in collaboration with the College of Agricultural Sciences.

Over the past five years, Penn State has made good progress in addressing sustainability. However, there is still much that needs to be accomplished if the University is to live up to the ideals expressed in its own Strategic plan (2016–2020). Every three years since 2011, Penn State has assessed its sustainability performance using an assessment protocol known as STARS, the Sustainability Tracking Assessment and Rating System, developed by the Association for the Advancement of Sustainability in Higher Education (AASHE).

In 2011 Penn State earned a silver rating on STARS. In 2014 its score rose eight points to earn a gold rating and in 2017, its score increased by one point, placing Penn State 4th among the nine Big Ten institutions that participate in STARS. Although this is certainly a respectable performance, Penn State's rate of improvement has slowed as many of the easy measures have been taken and the more difficult challenges remain. Over time, more institutions have advanced from a silver to gold rating and, for the first time in 2017, three institutions (Stanford, Colorado State, and New Hampshire) earned a platinum rating. If Penn State wants to be viewed as a leader in sustainability, it must re-energize its efforts in this area.

The STARS sustainability assessment adopts a very broad view of the components of sustainability in higher education. In addition to education, research, and operational areas, it includes diversity and affordability, investment and finance, and wellbeing and work. The SI will partner with the units that have primary responsibility for each of these areas, and advocate for the designation of sustainability champions within the unit, creating a sense of shared ownership of sustainability goals. In this way, the SI will work to embed sustainability firmly and deeply across the University.

In this Work Plan, the Sustainability Institute proposes both systemic changes in sustainability and some tactical changes that are rewarded by STARS, and will be relatively straightforward to accomplish such as implementing a Sustainability Literacy Assessment

(Sulitest) and producing an online training module on sustainability for use by new employees. Other measures can only be implemented with cooperation and assistance (and in some cases, resources) from other units of the University, with guidance and support from the Sustainability Institute. For example:

- increasing the prevalence of sustainability learning outcomes in academic programs
- creating new sustainability courses
- reducing greenhouse gas emissions through a variety of measures, including converting from traditional to clean/renewable energy sources, improving energy efficiency in buildings, and encouraging more sustainable commuting by employees.

Scope: Sustainability at Penn State and Across Pennsylvania

Since its founding, Penn State has repeatedly answered the call to address societal challenges by recognizing turning points in history and seizing the opportunity to run at the vanguard of innovation in teaching, research, and service. Students learned how to ensure food security by increasing yields in the 19th century. University leadership ensured access to higher education through a system of Commonwealth Campuses in the 20th century. Over the past century and a half, Penn State has grown to twenty-four campuses throughout the Commonwealth, and has become one of the most comprehensive institutions in the country, offering nearly every field of study in higher education. In the 21st century as the world faces new challenges of the Anthropocene era¹, Penn State is once again transforming education to address key challenges of climate change, stewarding our natural resources and ensuring the health and well-being of communities. The transformation encompasses generating and disseminating new knowledge, skills, and values and modifying physical plants and operations. All of these challenges fall within the domain of sustainability.

Sustainable Development Goals

Sustainability at Penn State is at an inflection point. The University Strategic Plan provides the foundation for sustainability with its five themes that cut across the 17 Sustainable Development Goals (See Table). With the hiring of its first Chief Sustainability Officer, Penn State has signaled elevating sustainability to strategic importance within the institution. The Sustainability Institute currently consists of a small but dedicated team of individuals with broad sustainability expertise. The size of the team is a limiting factor in terms of what can be accomplished.

Table – Penn State Strategic Plan Themes and 17 SDGs

As a result, we believe that three key shifts are required in the way we approach sustainability at Penn State. The first is to conceptualize sustainability as a regular function at the University, similar to the way budgeting, communication, human resources, and information systems are delivered within the institution. This implies a more distributed

¹ The Anthropocene defines Earth's most recent geologic time period as being human-influenced, or anthropogenic, based on overwhelming global evidence that atmospheric, geologic, hydrologic, biospheric and other earth system processes are now altered by humans.

approach to sustainability with sustainability champions embedded within campuses, colleges and units who are tasked with leading sustainability efforts within their area of responsibility. This shift would essentially create pan-centric leadership across the institution and help units have ownership of sustainability activities.

The second shift is creating a lean and supportive role for the Sustainability Office/Institute to play vis-a-vis the Colleges, Campuses, Extension and operating Units. The Office will serve as a place for designing and piloting sustainability solutions, instead of having primary responsibility for delivering programs. Our role will shift towards serving as a catalyst, coach, consultant, convener and a support system for the thirteen Colleges, 24 Campuses, Office of the Physical Plant, and other units in all matters relating to institutional sustainability.

In the world of sustainability, the temptation is great to try almost anything and everything to find out what will move the needle in the desired direction. In the initial start-up phase of the institute, a broad array of initiatives were launched, some more successful than others. Finite resources and a shrinking time horizon for achieving meaningful change have created a great sense of urgency around reducing carbon emissions to deal with climate change and addressing global sustainable development goals. As a result, the third shift at the Sustainability Office/Institute will be to pursue a strategy of **focused** acceleration.

The McKinsey Center for Business and Environment sees focused acceleration as a method in which organizations focus change efforts on a few big priorities and execute them well instead of implementing many small initiatives. Those that do, achieve greater results faster. Focused acceleration means putting most of our effort and resources toward implementing a narrower set of solutions in order to make substantial and lasting progress (*McKinsey Center for Business and Environment, November 2017*). For Penn State sustainability, this means determining jointly with Colleges, Campuses and other units, which activities will deliver the greatest impact, concentrating our effort on those, and resisting the temptation to be "all things to all people."

This document is the focused Work Plan for 2018-2021 and outlines program goals, activities, performance metrics, and resource needs in each functional area. It is built on conceptualizing sustainability as a function that is distributed across the institution, shifting the role of the SI from one of implementing programs to a role of consulting, convening, and coaching the network, and exercising the discipline of focused acceleration in order to achieve significant and lasting progress.

Penn State Strategic Themes mapped onto the Sustainability Institute's work

Penn State is deeply committed to sustainability as reflected in its strategic plan, built around the themes of stewarding our natural resources, and ensuring the health and well-being of its communities. Our vision is to be a leader in research, learning, and engagement that facilitates innovation, embraces diversity and sustainability, and inspires achievements that will affect the world in positive and enduring ways. Our foundational principles include enabling access to education, engaging our students, fostering and embracing a diverse world, enhancing global engagement, driving economic development, and ensuring a Sustainable Future. This strategy implies "sustainability" as a basic function that

encompasses all aspects of research, teaching, operations and physical plant, student life and community engagement.

Penn State's strategic plan describes sustainability as the simultaneous pursuit of human health and happiness, environmental quality, and economic well-being for current and future generations. These definitions are manifested in the form of specific goals in the United Nations' Sustainable Development Goals ([Agenda 2030](#)). These goals are built into the founding principles and thematic areas of the Penn State's Strategic Plan. We seek to not only produce new knowledge and innovations to meet these goals, but also to train our students as tomorrow's sustainability leaders, to change institutions and engage our internal and external communities and stakeholders to foster sustainable living. We will pursue a broad approach to sustainability that goes beyond environmental to social, economic, and cultural improvements that are inclusive of all.

Earth's systems and climate are deeply intertwined with economic, social, and political systems. All these are changing in unpredictable and accelerated ways, challenging planetary boundaries and causing more frequent and large-scale disasters. Penn State seeks to ensure our sustainable future by addressing primary challenges of the Anthropocene era.

To meet the sustainability aspirations of PSU, this SI Work Plan seeks to build the sustainability function in an evolutionary, consultative, and collaborative manner. Working in the service of and in collaboration with all the Colleges, all Penn State Campuses, Finance and Business, and Athletics we seek to build sustainability capacity within the whole University.

Vision

We aspire to infuse sustainability knowledge, values, and practices across Penn State University, all 24 Campuses and 13 Colleges, and the entirety of its operations, in a way that achieves sustainable development that benefits the entire Commonwealth of Pennsylvania and the world.

Mission

We will comprehensively integrate sustainability into the University's core fabric of research, teaching, outreach, and operations that will transform students, faculty, and staff into competent sustainability leaders capable of carrying out our vision for the future.

II. Sustainability Function Areas of Work

Our Sustainability efforts are organized around six key functional areas that mirror the organization and structure of the University: Teaching and Curriculum, Co-Curricular Engagement, Research, Community Outreach and Engagement, Finance and Business (Operations) and Administration.

Work Area 1. Curriculum and Teaching

Penn State's Sustainability Strategic Plan calls for academic programs staff and affiliated

faculty to integrate sustainability across the educational programs of the University. We support individual faculty, programs, and colleges to develop sustainability education content, pedagogy, and research. We seek to transform the University's teaching and learning culture so that sustainability competency and literacy becomes a universal learning outcome.

Work Area 2. Student Life and Co-Curricular Learning

Co-curricular experiences transcend merely getting students involved in campus life. Co-curricular activities are intentionally-designed programs and activities with measurable learning outcomes that are connected to explicit educational objectives of the University such as leadership. We support transformative co-curricular experiences that achieve sustainability learning objectives for all Penn State students.

Work Area 3. Sustainability Solutions Research

Penn State is recognized as a leading Research I institution that consistently ranks in the top 20 academic institutions and is home to six highly competitive interdisciplinary research institutes. The University's goal is to conduct research that is transformational and has positive societal impact. The Sustainability Institute can play an important role in enhancing transformative impact by facilitating and supporting transdisciplinary work focused on the challenges of sustainable development at multiple scales.

Work Area 4. Finance and Business

The buildings and grounds and human resources of the University are key assets that support its mission. In many ways, universities function like large cities and businesses simultaneously. The physical, human and operational dimensions of the University create a unique space in which to implement impactful changes in the way we operate. Our ability to operate in new ways, engaging a diverse swath of stakeholders to create new paradigms has the potential to serve as an example for cities and businesses, thereby multiplying our impact beyond the borders of our campuses.

Work Area 5. Community Outreach and Engagement

As a land-grant institution, Penn State has a long tradition of community outreach and engagement. Within the Sustainability Institute, the focus of community outreach is on the development of programs that accelerate and expand the commitment to sustainable practices in the public and private sectors. By partnering with Penn State Extension, Professional and Continuing Education (PACE) and other Penn State units and working in collaboration with our Penn State Campuses, the Sustainability Institute enables Penn State to have unparalleled impact on the Commonwealth of Pennsylvania in delivering the promise of sustainability for current and future generations.

Work Area 6. Administration and Communications

This function includes administrative support, finance and accounting, hiring and retention, communication, metrics and reporting, analytics, and development/fund raising.

Goals, Programs and Activities in Each Area

Work Area 1. Curriculum and Teaching

Background: Penn State's Sustainability Strategic Plan seeks to integrate sustainability into the core fabric of the University's teaching missions (Goal 1 - Learn, Strategy 1.2.) and in the General Education Learning Outcomes. Through the Academic Programs Manager, the Sustainability Institute will provide support to all thirteen Colleges and 24 Campuses to enhance their sustainability Teaching & Curriculum. We will support faculty with focused programs and resources to develop and deliver sustainability-focused curriculum and programs for students.

Goal 1: Every student at Penn State will have the opportunity take one or more sustainability-focused courses prior to graduation.

Goal 2: Penn State graduating seniors will demonstrate acquisition of sustainability awareness, attitudes, and knowledge as measured by the Sulitest.

Achieving these goals will depend upon the extent to which we are successful in increasing the number of sustainability courses at Penn State as well as embedding sustainability competencies and content into existing courses. Our Academic Programs staff will collaborate with their peers across Penn State to support co-curricular and extra-curricular activities where students can realize their sustainability competencies in other contexts.

Programs and Activities:

Achieving these goals requires two actions. First, we will working with the Office of General Education to create more sustainability-focused general education courses across the requirements and through the integrative studies requirement. The second we will encourage and support all Colleges and Campuses to increase the number of sustainability courses available and making at least one course a degree requirement. The Smeal College of Business has already established a required sustainability course and has hired a sustainability coordinator for the college. Other Colleges are at different stages of integrating sustainability into their curricula. We will support colleges as per their needs in a number of areas:

Curriculum Development & Integration

a. Network of Sustainability Curriculum Champions

We will work with college deans, institute directors, and known faculty across University Park and Penn State Campus chancellors to identify faculty champions to lead the integration of sustainability into the curriculum within each college and on each campus. We will convene college-level and campus-level groups that will generate college-specific sustainability curriculum leadership councils to share best practices, monitor progress, address barriers, and hold each other accountable. These councils can scale up and be structured as needed and deploy a variety of strategies to accomplish curriculum and literacy goals. The individual programs are meant to synergize with one another to create a milieu that effects cultural change.

b. Development of Sustainability-focused Majors, Minors, and Certificates

We will work with faculty, departments, schools, colleges, and campuses to develop individual courses, programs of study, minors, and certificates. In order to increase access to the existing Sustainability Leadership Minor, the program can be redesigned to be delivered on more of the Commonwealth Campuses. A key component would be to make SUST 200 and SUST 400 available online.

c. General Education Requirements—Integrative Studies Courses

Penn State is actively soliciting the development of inter-domain courses among faculty. This is an opportunity for the Sustainability Institute to collaborate with the Office of Undergraduate Education in support of faculty teams to integrate sustainability competencies and content into courses and/or to develop courses focused on sustainability. We will conduct faculty workshops and provide consultation to faculty.

d. Engaged Scholarship

Penn State is making a significant investment in supporting engaged scholarship through the establishment of the Student Engagement Network. Engaged scholarship is a high impact pedagogical practice that has been demonstrated to improve student learning outcomes. We have piloted the Sustainable Communities Collaborative (SCC) as a platform for providing engaged scholarship opportunities related to sustainability challenges. The SCC model is currently being piloted on five additional Penn State campuses: Abington, Altoona, Beaver, Behrend, and Brandywine. The goal is to expand the SCC model to all of Penn State's campuses. Going forward, community partnerships will be managed by the outreach team within the Sustainability Institute, while faculty partnerships will be cultivated by the education work area.

Faculty Development and Resources

a. Faculty Workshops and Curricular Events

We will continue to support faculty by hosting workshops and meetings to assist them with integrating sustainability competencies into educational programs. Our intention is to create a more supportive culture, revise existing courses, and develop new courses. We will continue to support the Office of General Education's Integrative Studies programs through day-long workshops, implement a two-day summer curriculum workshop for faculty, host learning lunches, and reading clubs. We will continue to develop the Field Guide to Teaching Sustainability as a faculty resource. The Field Guide includes assignments, readings, and web-based resources. The Academic Programs Manager will develop a sustainability module that can be inserted into freshman seminars and will conduct a train-the-trainer workshop for faculty leaders on how to teach the module.

Sustainability Education Research

Sustainability Institute staff have published and presented on sustainability education in peer-reviewed journals, at conferences, and webinars. We have also helped to convene academic conferences including the Pennsylvania Environmental Research Consortium (PERC) and Sustainability Curriculum Consortium (SCC). The goal in this area is for Penn State to be a recognized leader in sustainability education by continuing to publish research related to teaching sustainability. The Sustainable Curriculum Leadership Council comprised of faculty champions from each college and each Penn State Campus co-create a research agenda. Faculty who are interested in pursuing research in this area will be invited to participate. Assessment of student learning outcomes using the Sulitest to determine the extent to which Goal 2 is achieved falls within this work area.

Performance Metrics:

1. Number of sustainability programs and courses in each college/campus, number of students who enroll in sustainability courses, number of colleges with a required sustainability course.
2. Sulitest administered to a representative sample of incoming freshmen in the fall semester each year and again in the spring semester four years later will demonstrate growth in student sustainability awareness, attitudes and knowledge.
3. Number of new blog posts, number of added resources, number of times the Field Guide is accessed by faculty, and faculty assessment of its usefulness as measured by an annual survey.
4. Number of inter-domain courses that include sustainability or are sustainability-focused, student enrollment in the same.
5. Number of new and returning faculty partners in the Sustainable Communities Collaborative.
6. Faculty development performance metrics may include number of faculty who participate in workshops, the disciplinary breadth of faculty, faculty assessment of value of workshops, number of revised courses, number of new courses developed, and number of programs revised.
7. Number of published research articles in peer-reviewed journals, number of citations, number of invited conference presentations.

Work Area 2: Student Life and Co-Curricular Learning

Background: Co-curricular experiences play an important role in fulfilling Penn State's goal to offer an immersive education in sustainability and to graduate students who "appreciate the importance of sustainable practices in all aspects of their lives, who become societal leaders and environmental stewards, who value their connection to their physical surroundings, and who embrace their role as responsible citizens" (*Penn State Sustainability Strategic Plan*). Sustainability can be embedded along the entire continuum of student

experience including student recruiting, new student orientation, residential life, and dining, clubs and activities, and on campus leadership opportunities. The Sustainable Food Systems Program and Student Farm are core components of this work alongside many other initiatives. These co-curricular experiences will be designed to complement and reinforce curricular sustainability offerings.

Goal 1: All new students will receive information about sustainability at Penn State and will be exposed to sustainability behavioral norms and programs.

Goal 2: Sustainability will be formally integrated into high visibility elements of student life at Penn State such as athletics and THON.

Goal 3: Students will have opportunities to develop skills and competencies as sustainability leaders through the Student Farm Club, the Student Sustainability Advisory Council, and other clubs and organizations.

Goal 4: Students will have opportunities to develop and become ethical and culturally competent leaders applying their knowledge on campus and at regional and global scales.

Programs and Activities:

For the purpose of organizing co-curricular activities, we have organized programs and activities into three main programmatic areas and a section on the Student Farm as described below.

Student Onboarding Experience

Before students are admitted to Penn State, all students will be exposed to sustainability as a value of the institution. Through the intentional communication of this core value, students will be more likely to adopt environmentally friendly behaviors (recycling in the residence halls, reducing food waste in the dining halls) and integrate sustainability into their academic plan of study (Sustainability Leadership Minor). Integration into already established onboarding mechanisms can be achieved through a series of partnerships with the Vice President for Undergraduate Education (New Student Orientation), Alumni Association (Lion Ambassador tours), Undergraduate Admissions (Student Minority Advisory and Recruitment Team tours & International Student Admissions), Office of Summer School (LEAP Prides), Student Affairs (FRESH Start) and various college deans (First Year Seminars), allowing us to highlight Penn State's sustainability commitments and accomplishments for incoming students, parents, and guests. Sustainability and zero-waste principles should also be integrated into other welcome week events (i.e., President's New Student Convocation, college dean's meetings, residence hall events).

Once students arrive on campus, the EcoRep program is intentionally designed to engage with students living in freshman residence areas (East and Pollock Halls) promoting environmentally sustainable behaviors (recycling, composting, energy reduction). This program is hosted by Penn State Housing in partnership with Residence Life, Shavers Creek, and the Sustainability Institute. Initial program assessment has shown it to be a valuable leadership development experience and there are reliable indicators that reinforce Penn State's commitment to sustainability. As this program reaches maturity (Fall 2018–2019),

resources will be needed for expansion to additional residence halls at University Park and to Penn State's Campuses.

Integrating Sustainability into Student Events

Once students arrive on campus and hear about the sustainability commitments that the University is making, we must reinforce that perception. It is critical that sustainability become integrated into highly visible events and organizations to normalize it as a cultural practice. We will take a progressive approach continuing the already established program incorporating zero-waste principles into various high-profile student organizations (THON, Movin' On, and Lion Ambassadors) campus events. With over 100,000 students attending these events, the inclusion of basic environmental sustainability practices encourages an atmosphere where student event organizers are aware of their activity's eco-impact, understand how their actions impact their local community and for those in attendance it will further normalize the use of compostable and reusable products.

A series of partnerships are needed to achieve this goal. The most critical aspect is improved communications between the Sustainability Institute, Student Affairs, and the Office of the Physical Plant's waste management program to ensure that all parties are fulfilling their role in achieving desired outcomes. Secondly, a commitment from the Vice President of Student Affairs (and his staff) should be secured to pilot an expansion into University Affiliate Student Organizations advised by the Student Affairs staff (THON, Student Programming Association (SPA), Student Engaging Students (SES), and University Park Allocation Committee (UPUA) and Homecoming). It is to be understood that students will be taking the lead on many of these transformations, but resources and consultations will be critical to seeing these transitions occur correctly. A series of online tools (event planning, purchasing guides) will need to be created, as well as an intern (or curricular experience) will need to be hired to act as consultants.

Supporting Student Organizations

Currently, at Penn State, there are over 1,000 student organizations. Almost half are co-curricular organizations intentionally designed to align with our academic objectives (e.g., UN Campus Advocates, Global Brigades, Vaccinate America, Social Justice Coalition) and provide robust, student-initiated educational events for the campus and the surrounding community. Using the Sustainable Development Goals as a guide, at University Park, approximately 300 organizations (one-third of the student organizations) are working to promote sustainable development in some way. If we include Penn State campuses and World Campus, our students can make a significant impact when actively encouraged and supported by faculty and staff and University policies.

There are numerous groups at University Park that promote high-quality sustainability-related educational events (i.e., Council of Sustainable Leaders, Society of Engineering Science, Black/Latino Caucus), which all share a common denominator of direct and active staff mentorship. Their work results in notable events such as the THON and the Martin Luther King Commemoration. A dedicated staff member in the Student Activities Student Organizations office (HUB 103), with a joint appointment at Sustainability Institute, would be needed to accomplish this. This person would advise, coordinate and support student organizations connected to sustainable development and support service-learning

opportunities on the Student Farm. Student organizations at Penn State campuses would be integrated in our efforts to provide equally valuable services to their campuses and communities.

Leadership for Sustainable Development

Penn State recruits some of the world's best students and seeks to provide them the ability to transform their communities, profession, and ultimately, the world. We will offer opportunities to address these challenges locally (on and around our campuses), nationally, and globally. For example, the [Millennium Campus Network](#) has already built a US-centric network of campuses committed to providing University students space to “rethink paradigms, promote collaboration, and transform dialogue into action.” United States’ higher education institutions have also created programs to expose students to the UN FCCC Conference of the Parties (COP) Annual Climate Negotiations. Penn State can join the growing network of colleges (i.e., Brown, Yale, Georgetown, University of Connecticut, Dickenson, Swarthmore), create an intentionally transformative experience for our students to attend, and connect with a global community of practitioners and scholars.

Finally, the Sustainability Institute should also play a role in envisioning how the future of Pennsylvania will unfold, using an innovative model created by the Crawford School of Public Policy at the Australian National University. This program connects students and faculty at local universities with local high school students to envision their communities in 2030. Students are responsible for meeting with local governmental leaders, researching the feasibility of local solutions, and innovating new uses of current technology. At the end of this yearlong experience, students meet to share their plan and create a summary report/poster exhibition that is then shared with state government leaders.

Performance Metrics:

1. Touch-points where students are exposed to sustainability as a Penn State institutional value.
2. Number of students who report sustainability being a motivating factor for choosing Penn State.
3. Number of individuals who self-report sustainability being an institutional value.
4. Large (attendance 500+) student-organized events where zero-waste principles are utilized.
5. Number of students actively participating in organizations connected with sustainable development.
6. Programs/events, engaged scholarship, or public outreach events hosted by sustainability-focused student organizations.
7. Number of students acknowledged through institutional awards (Rock Ethics Institute, student leadership, scholarships) for their active leadership.

Student Farm and Sustainable Food Systems

The Sustainable Food Systems Program is an interdisciplinary program of the Sustainability Institute, established in 2014. Its mission is to engage and educate students in issues of sustainability, health, local economic development, and innovation. We do this across the Commonwealth through using our own campuses and communities as living laboratories,

where students, faculty, and community members together identify and innovate solutions across our food system.

Broad and complex challenges demand innovative approaches that lean on all of our strengths as a university, in teaching, co-curricular engagement, research, outreach and operations. As a student-centered program, students have primary responsibility for their learning environment. They have been integral to development of the SFSP thus far, and will remain so into the future. Because this approach sits squarely in a co-curricular framework, the strategic plan for the SFSP sits here in co-curricular learning, but the goals and outcomes of the program span beyond this functional area. Our primary goals are fourfold:

Goal 1: Co-create solutions-oriented engaged scholarship opportunities in food systems with faculty, students, and community partners.

Goal 2: Foster student leadership and co-curricular student engagement opportunities in food systems.

Goal 3: Maintain vibrant student-centered campus farms and gardens at Penn State campuses.

Goal 4. Utilize academic, co-curricular, and operational assets across Penn State campuses to synergistically achieve SDG's related to food and farm systems through the Sustainable Food Systems Program.

Programs and Activities

1. We aim to co-create solutions-oriented engaged scholarship opportunities in food systems with faculty, students and community partners. This includes supporting courses through presentations, Student Farm tours and demonstrations, serving as a client for courses, facilitating course projects in partnership with our food systems partners across the Commonwealth, supporting personalized projects, developing and offering new food systems courses, and offering a Food Systems minor to students at all CWCs

2. Co-curricular activities include educating about sustainability in partnership with Housing and Food Services, coordinating volunteer service days, hosting a student internship program, supporting Student Farm Club leadership and projects along with food systems projects of other Penn State clubs, and gleaning efforts across campus and the community in support of food security. A full-time coordinator is needed to oversee the activities outlined in goals one and two, spanning academic and co-curricular learning opportunities.

3. The Student Farm at UP is one acre of diversified vegetables, and serves campus dining, our two fine dining campus restaurants, the Village at Penn State, and a small CSA. The Student Farm is a living laboratory for hands-on learning through independent research projects, course work and a farm fellows program. Paid and for-credit student farm fellows cultivate the fields, harvest and distribute crops, plan and lead tours, workshops, community events and volunteer days to share their learning with others and to build community. Planned expansion includes additional growing space to integrate new

products and systems, additional markets such as a Student Farm Food Truck, and the development of a therapeutic food garden for populations such as veterans, limited mobility individuals, senior citizens, and hospital clients. A full-time farm manager-educator is crucial to ensuring the long-term viability of the Student Farm and the programs and activities it enables.

4. A community of practice with programs across Commonwealth campuses will ensure mutual ideation, learning and student engagement opportunities across many types of communities and their respective food system opportunities and constraints. Eastern and Western regional coordinators will be essential to supporting this collaborative work.

Performance Metrics:

1. Number of courses and number of departments engaged through courses
2. Number of members in Student Farm Club; number and diversity of student-led projects and quality of projects.
3. Number of interns
4. Community partner feedback from collaborations with courses
5. Pounds of produce grown and sold
6. Number of events, workdays, workshops, and tours hosted on the farm and through the program

Work Area 3: Research Implementation and Sustainability Solutions Research

Incorporating sustainability solutions from University research programs is a key aspect of our work. There are many Penn State colleges and units already doing research on sustainability related topics from their own disciplinary perspective. For example, the Smeal College of Business has a program on sustainable business practices. Penn State Institute for Energy and Environment, and the Penn State Law College's proposed new Institute for Energy Law and Policy are doing pioneering work in their topic areas. The College of Earth and Mineral Sciences, College of Agricultural Sciences, and College of Engineering have many faculty studying topics such as natural ecosystems, climate change, agriculture and the food-water-energy nexus, and eco-technologies and materials.

A cursory review of externally-funded research projects indicates that there are nearly 400 faculty researchers actively pursuing sustainability related work at Penn State. A partial list of sustainability-related research projects can be found at <https://stars.aashe.org/media/secure/70/7/631/4543/STARS%20sust%20research%202017.xlsx>. Additionally, there are six interdisciplinary research institutes that offer opportunities for cross-disciplinary collaboration.

Goal 1: Enhance sustainability research at Penn State by building capacity for solutions oriented transdisciplinary sustainability research, and actualizing the “living lab” concept.

Goal 2. Support translation and implementation of research based solutions on themes where Penn State has strength

Goal 3: Create opportunities for undergraduate sustainability research experiences for students and for engaged scholarship.

These goals will promote successful collaboration and proposal efforts among faculty and staff with an interest in implementing solutions. In contrast to disciplinary research, and as a step beyond interdisciplinary research, trans-disciplinary research involves engaging in the coproduction and use of knowledge with societal impact as a central goal. This type of research can occur at a variety of scales, ranging from campus-level, to local, state, national, and global levels.

Programs and Activities:

Currently, the Sustainability Institute does not have a specific person devoted to coordinating or catalyzing research implementation. In preliminary conversations with faculty and administrators, we have identified several activities that we could beneficially facilitate.

Sustainability Experience Center (SEC) as a base for Living Lab Projects

Morning Star House and Grounds – Communities need to solve sustainability challenges at multiple levels. These range in scale and complexity, for example, from ground water management within a municipality or township, to energy transition planning for the Commonwealth of Pennsylvania. These pragmatic problems need both good science and strong community engagement. Using Penn State as a “Living Lab” is about doing transdisciplinary research to solve real world problems.

“Living Lab” is a term used to describe transdisciplinary solutions-driven research on our campuses and in surrounding communities. The Sustainability Institute developed a definition of a living lab for sustainability with the initiation of the Reinvention Fund in 2014. “A living laboratory is an ecosystem for learning that enables the unique features of our communities, facilities, campus grounds, and regional neighborhoods, to serve as test beds for the development of innovative solutions to real challenges. Through project-based teaching, research, and applied work, we will combine our talents across the functions of the University and within our community to explore, experiment, and evaluate actionable solutions.”

This work may be performed by a combination of faculty, staff, or students, community members. Examples of living lab projects include the Sustainability Experience Center (SEC) and Penn State’s Living Filter. The SEC is home to the Community Garden, the Morningstar Solar Home, a wind turbine, and a solar electric vehicle charging station. To nurture additional living lab projects we would develop academic and business plans for SEC assets to improve their utilization and management. The SEC could be a test bed for “living lab” projects. As part of the plan we would need clear articulation of Sustainability Institute’s role with respect to these assets. Projects could include relocating the Student Farm to this site with field and greenhouse production space and an activities building. The activities building could be the Geodesic Dome proposed for the NASA Habitat competition. The site could additionally house other living lab projects. The Sustainability Institutes’ connection to the Office of the Physical Plant and to academic units positions it to serve an integrator role in this context.

Implementing Transdisciplinary Research Solutions

Many researchers are doing sustainability-relevant work at Penn State that is well suited for implementation. We will assist in this process by bringing stakeholders in conversation with researchers focused on solutions. In large research universities the breadth of coverage sometimes leads researchers to operate within their own department and college siloes. We will assist in unifying sustainability discourses across colleges and campuses. We will organize meetings on transdisciplinary sustainability research opportunities. We will assist in co-developing with faculty and stakeholders thematic areas that have been identified by Future Earth in their *Vision 2025*² document. The eight research challenges outlined there are:

- *Deliver water, energy, and food for all, and manage the synergies and trade-offs among them*, by understanding how these interactions are shaped by environmental, economic, social, and political changes.
- *Decarbonize socio-economic systems to stabilize the climate* by promoting the technological, economic, social, political and behavioral changes enabling transformations, while building knowledge about the impacts of climate change and adaptation responses for people and ecosystems.
- *Safeguard the terrestrial, freshwater and marine natural assets underpinning human well-being* by understanding relationships between biodiversity, ecosystem functioning and services, and developing effective valuation and governance approaches.
- *Build healthy, resilient, and productive cities* by identifying and shaping innovations that combine better urban environments and lives with declining resource footprints, and provide efficient services and infrastructures that are robust to disasters.
- *Promote sustainable rural futures to feed rising and more affluent populations* amidst changes in biodiversity, resources, and climate by analyzing alternative land uses, food systems and ecosystem options, and identifying institutional and governance needs.
- *Improve human health* by elucidating, and finding responses to the complex interactions among environmental change, pollution, pathogens, disease vectors, ecosystem services, and people's livelihoods, nutrition, and well-being.
- *Encourage sustainable consumption and production patterns that are equitable* by understanding the social and environmental impacts of consumption of all resources, opportunities for decoupling resource use from growth in well-being, and options for sustainable development pathways and related changes in human behavior.
- *Increase social resilience to future threats* by building adaptive governance systems, developing early warning of global and connected thresholds and risks, and testing effective, accountable, and transparent institutions that promote transformations to sustainability.

² <http://www.futureearth.org/news/future-earth-2025-vision-sets-framework-programmes-contribution-global-sustainable-development>

Undergraduate Research Opportunities

The focus on engaged scholarship and co-curricular learning in our sustainability programs offers natural opportunities for expanding undergraduate research. There is a growing demand for such research opportunities among students, and potential employers are also eager to have student interns involved in research activities. Many sustainability projects are ideally suited to undergraduate student involvement. With the right resources this type of research could become a significant contribution of Penn State's educational programs.

Performance Metrics:

1. Number of sustainability solutions projects.
2. Number and dollar amount of proposals funded in related thematic areas.
3. Positive feedback from faculty re: our integrative networking building efforts.
4. Number of undergraduate students involved in sustainability solutions projects and publications.
5. Overall Penn State funding of sustainability-solutions work.

Work Area 4: Finance and Business

Background: The operational area of any University is the place where cutting edge research and teaching meets the road of application. Penn State is a \$5.6 billion enterprise that exceeds the GDP of the forty smallest countries in the world. We can make a major difference to global problems by diligently making decisions that balance economics, environment, and social justice issues in every facet of our operations.

Goal 1: To change and enhance our operations to not only adapt and combat the effects of human-induced climate change, but to reverse the current direction of climate change.

Goal 2: To examine sustainability improvements in all areas of Finance and Business, identify some key impact areas and enact programs within those, to improve our performance on pre-established metrics and STARS measures.

Goal 3: To educate staff about sustainability concepts, engage employees to recognize the actions and processes that we need to change, empower them to be part of the change process, encourage them to pioneer new solutions, and create vehicles for their ideas to be heard and shared.

Programs and Activities:

Two sub-work areas aimed at enhancing sustainability performance are needed within Penn State operations: the Sustainable Operations Council and Employee Engagement.

Sustainable Operations Council

The purpose of the Sustainable Operations Council is to support the strategic engagement of sustainability as a core business strategy that strengthens and accelerates Finance and Business's ability to provide quality service, while reducing operating costs and creating

long-term value for the University's mission of teaching, research, and service. Currently the council has identified nine major areas in which to focus these efforts. In the first year, the focus will be on launching a University Waste Task Force, to establish a process and methodology to create sustainable solutions in broad reaching operational issues. Lessons from this pilot can then be applied to the other opportunities including carbon management; capital planning; building maintenance and transportation; long-term sustainable investing; stewardship of water and food resources; and digital innovations. It is the SOC's intention that solutions emerging from the various task forces will be applicable to all of Penn State's campuses, including opportunities unique to Hershey Medical Center

The three-year Work Plan of the Sustainable Operations Council is available as a separate document. A full explanation of priority areas is in Appendix A.

Penn State Athletics is a separate entity within the University that has a significant impact on the University's footprint in terms of water, energy, and waste. Efforts of the Sustainable Operations Council to minimize waste and reduce energy consumption should include athletics within the set of solutions offered. Athletics also has an important role to play in influencing behavior among students and fans which could have positive implications for other units.

In order to realize the potential of Living Labs, Penn State will seek to have a positive impact on the broader community and to have similar positive impacts on our campuses. This is an opportunity for research-based operational improvement. This could be structured as a Sustainable Campus Collaborative program that parallels the Sustainable Communities Collaborative program. Leveraging Penn State's strength in engaged scholarship, challenges identified by the Sustainable Operations Council and/or unit leaders may be scoped as projects that can be addressed by faculty and students.

Performance Metrics:

1. Number of new policies adopted or policies changed aimed at reducing Penn State's environmental footprint.
2. Task forces will suggest metrics for their projects.
3. Number of Sustainable Campus Collaborative projects completed.

Employee Engagement

Background: Penn State has a stated mission to embed sustainability into all of its functions. Engaging its approximately 14,000 non-academic staff and 8,000 academic staff will be critical to achieve this type of cultural transformation across all 24 Penn State Campuses. Our employees are not only a resource of expertise and experience, but they also are on the front lines and touch on every service, policy, and process in our organization. Transforming our operations, curriculum, engagement, and outreach will not only produce operational savings and informed citizenry, but it has been shown in other organizations to improve the productivity, creativity, and attitudes of the workforce, enhancing job satisfaction, and reducing turnover and absenteeism.

Programs and Activities:

A key strategy is to offer a variety of entry points to staff, depending on their phase of employment, level of knowledge, and interest. Twenty-five percent of our effort will be focused on recruitment and on-boarding strategies with the remainder focused on staff development and employee engagement.

Employee Recruitment:

It is easier to hire people with particular attitudes and values than it is to train them once they have joined the team. This is true for appreciating diversity, being student-centered, or having a sustainability mind-set. Penn State's goal should be to recruit faculty and staff who are already committed to sustainability and the associated values of diversity and inclusion.

- a) **Job Advertisements:** Work with Human Resources to embed sustainability language into job ads similar to Equal Employment Opportunity statements as a signal to prospective employees that Penn State is serious about both.
- b) **Interviewing Candidates:** Work with Human Resources to suggest questions that interviewers can use in the interview process. By adding a question about sustainability in the interview process, it signals to the successful candidate that sustainability is a priority at Penn State and primes new hires to be aware of sustainability as an institutional value.

Employee Onboarding:

New Employee Orientation is the ideal time to share Penn State's values, including sustainability. The Sustainability Institute already presents sustainability concepts and resources to new Finance and Business employees, closely collaborating with the Ethics and Diversity staff, interrelating the concepts. We will expand this effort by working with Human Resources, colleges, and units to determine the best strategy for incorporating sustainability into onboarding activities. Approaches may include in-person presentations, employee handbooks, and online onboarding modules.

Staff Professional Development:

Over the past three years, Penn State has developed a new online performance management program to standardize the employee goal setting, training, and evaluation process. Embedding sustainability in each step of this continuum will scale the impact of our efforts.

- a) **Sustainability Literacy Test (Sulitest):** An initial step should be to establish baseline measurements for our workforces' literacy in the sustainability realm. We will select an assessment platform and launch and use the findings to develop additional training and educational resources in the future.
- b) **Integrate sustainability into job descriptions:** Work with units to encourage the integration of sustainability into position descriptions.
- c) **Integrate sustainability into You@PSU Goal Setting:** Work with Human Resources and units to insert sustainability competencies in position descriptions and connect

sustainability to Job Responsibility Worksheets and Performance Management Worksheets. As position announcements are written during recruitment, ensure that the job description includes a sustainability component. We will work with Human Resources to include sustainability as an expected part of the goals.

- d) **Supervisor Training:** Develop training for supervisors to provide feedback to their direct reports. Track sustainability in performance goals by co-hiring an intern with Human Resources to conduct an assessment. Based on the assessment, focus efforts on colleges and units with low adoption rates.
- e) **Employee Certificate in Sustainability:** Create an online sustainability certificate for employees. This should include several levels, depending on the role, interest and needs of the employee. Develop modules on energy, water, waste, events, food, transportation, and other topics. Explore using micro-credentialing/badging to document professional development achievements. Incorporate modules into the Learning Resource Network.
- f) **Green Paws:** Employee training towards specific sustainability practices. The Green Paws Program is designed as an easy, self-guided program to educate office staff about resource efficiency and healthy habits they can adopt in the office and at home. There are over 200 offices working on the program with over 2,000 participants. We will continue to refresh the program and explore an online platform to host the program with a goal of having 20 percent of the University employees complete at least Level 1 by 2021.

Employee Outreach

- a) **Green Teams:** An assessment of the Green Team program is being conducted and the findings will be used to recommend modifications to ensure success under changing circumstances. Considerations will include whether a network of staff champions, trained through the sustainability certificates program, should replace or augment the current Green Team system. If a staff network system were created, strategies should be explored to create synergies with the proposed Commonwealth campuses network and the academic colleges champions. Continue to publish monthly newsletters, conduct educational challenges, and host an annual Green Teams lunch.
- b) **Recycling Roadshow:** The Sustainability Institute assists the Office of Physical Plant with developing and implementing outreach initiatives to help faculty, staff, and students understand the waste management program. The Recycling Roadshow has been presented annually to approximately 400 faculty and staff, along with a variety of marketing materials to support recycling and composting. Develop an online module. The Sustainable Operations Council Waste Management Task Force will provide direction for waste education for coming years.
- c) **Targeted Outreach Campaigns:** Create sustainability outreach campaigns for paper reduction, waste reduction, transportation, and food in coordination with Sustainable Operations Council initiatives. Launch a paper reduction campaign with a goal of 200 participants across multiple units in the first year.

Performance Metrics:

1. Number of Green Teams and number of faculty and staff participants.
2. Number of offices achieving Green Paws Certification.
3. Number of employees earning sustainability certificates and/or completing training modules.
4. Percent of employees achieving a passing score on a sustainability literacy assessment.
5. Percent of job ads and job descriptions posted that include sustainability knowledge and skills.
6. Percent of staff performance management plans that include sustainability goals.

Work Area 5: Community Outreach and Engagement

Background: The mission of the Sustainability Institute's outreach activities is to accelerate learning about sustainability and expand the commitment to sustainable practices in the public and private sectors. As education professionals, we continually ask who needs to know what about sustainability and how can we best facilitate their learning through outreach and engagement initiatives. A strategic partnership with Penn State Outreach, specifically Penn State Professional and Community Education, Penn State Public Media, and the Outreach Development office will enhance and create mutually beneficial initiatives to increase sustainability in local and regional communities and amplify the impact of the University's Outreach Mission.

Goal 1: Expand student access and community access to engaged scholarship focused on sustainability challenges through expansion of Sustainable Communities Collaborative to additional Penn State campuses and leverage Penn State's urban centers.

Goal 2: Increase sustainability literacy in public and private sectors by developing sustainability training programs and outreach activities for professionals and lay practitioners.

Goal 3: Expand commitment to sustainable practices and policies at the local and state levels through programs aimed at policy makers and decision makers.

Goal 4: Foster strong, resilient, and sustainable communities through programs and engagement processes that build collective vision and skills in sustainable development.

Programs and Activities:

Sustainable Communities Collaborative

The Sustainability Institute's signature outreach program is the Sustainable Communities Collaborative (SCC). It serves multiple objectives: By connecting local governments to Penn State's expertise, it fulfills the outreach mission of facilitating learning and expanding commitment to sustainable practices on the part of local government and non-profit organizations. It expands capacity of local governments and other partners to implement

sustainability initiatives. It also gives students a hands-on experience with a sustainability project. It mobilizes faculty and student time, talent, energy, and passion to make a meaningful difference in the world. It supports the University's commitment to sustainability, fulfilling in part the University's land grant mission, and the University's Carnegie classification for Community Engagement.

We will continue to operate the Sustainable Communities Collaborative at University Park and support a network of affiliated programs across Penn State's campuses. The SCC will expand the Sustainability Institute's outreach function, while helping the education function through engaged scholarship. There are several actions that could strengthen the SCC.

We will develop a set of courses/faculty to offer standardized, repeatable solutions to communities. Example: Jeffrey Brownson's EGEE 437 course in which students need to conduct a feasibility study for a solar installation. Similar courses could be used to teach students to conduct greenhouse gas inventories, greenhouse gas accounting, and energy audits of buildings. The Sustainability Institute would need to recruit corporate and local government partners from across the Commonwealth and offer this as a valuable service. We will also develop a local sponsorship model to increase funding for expanding the SCC across the Commonwealth. We will strengthen Penn State's connection to Pennsylvania Municipal League, Pennsylvania State Association of Township Supervisors, Pennsylvania Association of Borough Managers and other organizations. We hope to connect the SCC to UN Sustainable Development Goals and to U.S. Green Building Council LEED for Cities/STAR Community Rating framework to measure impact in communities across the Commonwealth.

The Penn State Urban Centers in Philadelphia and Pittsburgh are vital to re-imagining the land-grant mission in the 21st century. Capitalizing on the role of the urban centers as "trusted liaison" in the community and building on the Study Away Pittsburgh and Philadelphia programs, the Sustainability Institute can facilitate connections between Penn State faculty and students to address community-identified priorities and bring Penn State expertise to bear in solving community challenges. This may include initiatives to expand access to Green Infrastructure expertise for stormwater management.

Other identified opportunities include:

- Conferences and Institutes – working with C&I to disseminate sustainability-related materials across C&I's programs and develop new content for targeted audiences.
- Osher Lifelong Learning Institute – promote existing sustainability-focused programs and assist in contributing or developing content to OLLI's programs for older adults.
- PennTAP – collaborate on the development of programs and initiatives aimed at promoting energy efficiency and energy conservation for various sectors; student internships; and community energy solutions programming.
- Shaver's Creek – assist with new program development such as the Green Day initiative aimed at students; leverage Shaver's Creek facilities for program delivery.
- Public Media (WPSU) – leverage public media to advance the University's sustainability vision and goals by collaborating on the design, production and delivery of multi-faceted media that stimulate dialogue and empower action around important social and environmental issues; incorporate sustainability into Science U programming to tap into underwriting dollars.

- Small Business Development Center – establish a “Green Business Certification” program.
- Development – collaborate on development opportunities.

Building Capacity: Sustainability Certificates for Professionals and Lay Practitioners

The Sustainability Institute in collaboration with Penn State Outreach will develop educational programs aimed at professionals and lay practitioners. The Sustainability Institute will work with Outreach's Professional and Community Education (PACE) to develop certificate programs aimed at professionals. These programs can be a source of sustainable revenue for PACE and the Sustainability Institute. Additionally, the Sustainability Institute will work with Penn State Extension to develop a non-credit certificate program for the general public similar to Master Gardeners, Master Naturalists, and other programs.

Evidence-Based Sustainability Policy Making

In the Anthropocene Era, there is an urgent need to inform policy and policy makers. Their decisions have long-term implications for the sustainability and resiliency of the communities they serve and collectively for the planet. The Sustainability Institute could support Penn State efforts in numerous initiatives that encourage evidence based policy making, such as the Energy University, the Institute for Energy Law and Policy, the Local Elected Officials (LEO) Forum. As the Energy University initiative gains momentum, we could partner with various Colleges to address energy transition strategies for Pennsylvania towards renewable energy, energy literacy needs among the public, and policy makers, Energy scorecards for cities, energy-focused workshops for policy makers, energy case studies that illustrate success stories in the transition to a clean energy economy. Penn State could create a platform to facilitate peer-to-peer learning among local elected officials and local government staff. The forums could be facilitated regionally with the assistance of the Penn State campuses and/or Penn State Extension. The Sustainability Institute would seek to co-sponsor these with PSATS, the Pennsylvania Municipal League, the Pennsylvania Association of Borough Managers, and the County Commissioners Association of Pennsylvania.

Community Outreach

PA 2050—This initiative invites the public and policy makers to collectively imagine a positive vision for Pennsylvania in 2050 that addresses a broad array of sustainability topics including energy, water, food, land use, and transportation from environmental, economic and social impact perspectives. We would help to coordinate annual events such as lectures, film screenings, and other activities that engage the general public and build support for action at the individual, community, regional, national, and global levels. In order to have the broadest impact, the Sustainability Institute should also support the Penn State campuses in coordinating similar events in their communities.

Performance Metrics:

1. Number of partnerships established with state agencies, non-profits and foundations.

2. Sustainable Communities Collaborative—Increase the number of community partners, faculty partners, and students who have participated in an SCC project; Penn State campuses increase external funding for their programs by using the MOU process.; increase number of faculty partners and community partners across Penn State campuses, increasing number of students participating in projects across the Commonwealth.
3. Number of students enrolled in Study Away Pittsburgh and Philadelphia and student reports of their experiences
4. Number of programs offered annually for professionals and lay practitioners, number of participants enrolled, revenue generated.
5. Number of workshops conducted on energy literacy, number of participants, participant learning outcomes, case studies written and distributed.
6. Number of policy maker forums convened, number of participants, number of policies adopted, estimated policy impacts (avoided CO2 emissions, waste diverted, etc.)
7. Number of community outreach events hosted, number of participants, local plans formulated; PA 2050 process.
8. Number of programs with sustainability focus offered annually through Penn State Outreach; number of participants; number of students impacted.

Work Area 6. Administration and Communications

Background: In order to fulfill its mission of integrating sustainability into the fabric of the University across all functional areas, the University must organize itself to leverage the expertise, passion, energy and commitment for sustainability that exists across the University and among external stakeholders. Instead of assuming sole responsibility for delivering the promise of sustainability, the Sustainability Institute must link arms with other units, mobilize resources, elevate the visibility of others' contributions, and coordinate activity across institutional boundaries. This shift emphasizes the role of the Sustainability Institute as consultant, catalyst, convener, connector, coach, and cheerleader.

The scope and scale of the mission will require an "all-hands-on-deck" mentality where it is vital for each department, unit, college, and campus to identify sustainability champions tasked with implementing sustainable solutions and cultivating a culture of sustainability. So we recommend sustainability responsibility be assigned in each unit of the University. This could be a quarter- or half-time person to begin with and can grow with the needs of the unit. This way sustainability staff will "sister" with unit personnel to jointly take forward sustainability projects embedded in the units. The Sustainability Institute will convene networks of sustainability champions to accelerate learning about sustainability and expand the commitment to sustainable practices across the institution and the Commonwealth.

Goal 1: Create advisory structures to guide sustainability work at Penn State in a representational and stakeholder engaged manner.

Goal 2: Develop a structure of sustainability work that allows ownership of sustainability activities to lie in the various colleges and Penn State campuses and other relevant operating units.

Goal 3: Rebrand Sustainability Institute/Sustainability at Penn State.

Goal 4: Update current website and potential development of program sites.

Goal 5: Create marketing materials for institute and individual programs.

Goal 6: Build communicators network throughout University.

Goal 7: Develop student brand ambassadors for sustainability at Penn State.

Goal 8: Create Sustainability annual report.

Programs and Activities:

Establish an External Advisory Board

The mission of the External Advisory Board (EAB) is to provide advice and counsel to the Penn State Sustainability Office and to act as spokes persons for sustainability at Penn State. To help achieve University strategic goals on sustainability; to advise on industrial and societal needs and trends; to assist institutional development of the sustainability function; to help recruitment of high quality faculty and students and reach out to alumni. The EAB will be comprised of recognized sustainability leaders from business and industry, government, non-governmental organizations, and foundations.

The board will work with the Chief Sustainability Officer (CSO) under the guidance of the University President and Provost. Board Members' roles and responsibilities are advisory. Members should have a high interest in the success of sustainability at Penn State, participate actively, be willing to contribute skills and influence toward achieving Penn State's sustainability goals, and maintain communication with EAB members and CSO.

Strategic Partnerships Initiative

The Sustainability Institute has a unique opportunity to cultivate industry and corporate partnerships in the area of sustainability that link directly to the business objectives of the external partners and to research, education, outreach, and operational sustainability issues within the University.

Vision & Goals: Higher Education and Industry partnerships that leverage the best capabilities of each partner to create a more just and sustainable world. The purpose of the Strategic Partnerships Initiative is to cultivate relationships with appropriate industry partners that connects their sustainability objectives and needs directly to the Penn State research, academic, outreach, and operations community. Co-developed solutions will have direct application and a larger impact on both the industry and Penn State communities and decrease the lag time from higher education to market implementation. Our goal is to initiate and cultivate three partnerships each year, while establishing at least one gold-standard partnership each year. Gold-standard defined both as multi-million-dollar commitment and deep working engagement by partners.

Three Year Plan: In year one, we will continue to work on and refine the PepsiCo partnership to create the gold standard version of an industry and higher education collaboration. Identify and begin to cultivate two more potential partnerships that will follow the PepsiCo model. Create a job description and initiate budget process for a potential new hire as the Strategic Partnerships Director. Utilize partners to help create the External Advisory Board for the Sustainability Institute.

In year two, we will gain approval and hire a full time Strategic Partnership Director. Finalize and move two potential partners into gold standing, while initiating three new partnerships. Identify and cultivate remaining partners that fill industry opportunities not satisfied by the current partnerships. Solidify the External Advisory Board and use that group to help identify and cultivate more partnership opportunities.

By year three, we will create standard operating procedures and policy around gold-standard industry partnerships. Create a new three-year strategic plan with specific industries to target, new positions if necessary, and identify other funding possibilities.

Communications

The key communications challenge is building sustainability as a central aspect of the overall Penn State narrative. This narrative needs to strike a balance between academic and athletic accomplishments and the broad and varied community contributions of Penn State. From time to time distracting events of hazing and other scandals have tainted the University's image and taken on disproportionate attention in the media. Communicating sustainability values and activities can serve a unifying narrative across many intellectual domains in which Penn State leads (Agriculture, Meteorology, Earth Sciences, Engineering, Business and Law), athletics, and student life. The Communications function at Penn State is well integrated in its colleges and campuses. Working as a "sister function" with communications teams we hope to improve the profile of sustainability activities across the University.

Performance Metrics

1. Level of Advisory Board engagement
2. Sustainability Institute annual report published.
3. Number of corporate partnerships developed and level of sponsorship committed.
4. Number of visitors to Sustainability pages on Penn State websites

III. THE COMMONWEALTH CAMPUSES

A study commissioned by the Sustainability Institute in 2016-17 and published in November 2017 revealed a great deal of activity related to sustainability across Penn State's 24 campuses. The Sustainability Institute subsequently convened a series of three regional forums in May 2018 in order to facilitate the sharing of best practices and the establishment of a community of practice among faculty, staff, administrators and students. The regional forums confirmed the findings of the study in terms of the breadth of sustainability engagement and the varying degrees of engagement across the campuses. The regional forums also revealed common obstacles and needs that the institute could address. These include:

- Facilitate policy harmonization across campuses with respect to sustainability

- Provide community building and professional development opportunities through a series of webinars and a listserv
- Case Studies of exemplary projects
- Documentation of Best Practices
- Tools such as templates, guidelines, and forms (example: Field Guide to Sustainability)
- Funding for student events, outreach activities, attendance at conferences, and faculty release time to provide campus sustainability leadership, etc.
- Assistance with communication needs and web presence
- Point of contact at the SI for curriculum, student engagement, operations, etc.
- Provide opportunities for recognition.

The campuses have an important role to play in not only educating students, but in helping the communities in which they are located to improve quality of life and enhance sustainable outcomes for the people of Pennsylvania. The SI is committed to supporting and strengthening sustainability efforts and leadership at the campuses by providing tools and resources and creating opportunities for leader-to-leader learning and inspiration.

IV. RESOURCE NEEDS

It is clear that we have an ambitious agenda of building a University-wide sustainability function. To enable this function, the Sustainability Institute needs to be resourced appropriately to complete the work outlined in this plan. In this section we articulate the resources needed work-area wise. With the current level of staffing we have basic resources to begin moving in the direction outlined in this plan. We anticipate additional resources can be added incrementally over the next five years to fully flesh out the function. The resources being requested are in line with past staffing levels and based on incremental increases annually. In the past, there were as many as 13 full-time staff working on sustainability at Penn State. Over the years many of them left and were not replaced. Our staffing approach is one of sharing the work with various colleges and campuses where sustainability needs to be reside. We anticipate sustainability to operate as a sister function to other functions such as human resources and communications.

The Business Case for Sustainability

Economic justification of increase in staff is based on following benefits

1. We are building a sustainability function across the University adding real meaningful activities to the University's Strategic Plan promises, and earning credibility with stakeholders;
2. Increase in student, faculty and staff participation in sustainability programs;
3. Sustainability Solutions Research could explore new avenues of funding from foundations, philanthropists, and crowd sourcing;
4. Cost savings in waste reduction, energy conservation;

5. Sustainable procurement of the top 100 spends can save 3 percent to 6 percent through application of life cycle costing and greening of supply chain practices, and benefit fair trade, women owned businesses, and developing countries;
6. Financial internal rate of return on sustainable energy and logistics projects can be 27 percent to 80 percent ([Harvard Business Review](#));
7. University image as a sustainability leader will attract more creative students, staff and community partners;
8. Employee motivation resulting in increased productivity of 15 percent through employee training and employee contact and engagement have been reported ([Delmas and Pecovic, 2012](#)). A very conservative estimate of even 1 percent increase in productivity on 50 percent of the University wage bill of \$2 billion, would give productivity gains of \$10 million;
9. Risk Management costs of the University in terms of exposure to carbon risks, nitrogen risk, water risks, will decline;
10. Sustainability is a driver of innovation. It will boost innovation performance of other programs such as adding ecopreneuring to Invent Pennsylvania, adding aesthetics and arts to ecological designs.

Resources Strategy

The Sustainability Institute has resources to initiate moving in the directions indicated in this Work Plan. However, the plan is very ambitious. It seeks systemic changes at all levels from strategic to operational. It encompasses all 13 colleges and 24 campuses of Penn State. It envisions sustainability as a permanent function within the University. Hence resourcing all the activities envisaged here would require additional resources. However, we anticipate that these resources will be needed incrementally over time and can be garnered via the normal resources allocation processes of the University.

Our resource strategy is linked to the concept of “sharing responsibilities for sustainability” programs. We believe that eventually sustainability should be owned by each College, Campus and Operating Unit. It should not be something that a small group called SI does for others. Accordingly, our resource allocation approach is for SI to seek basic resources to be the initiator, coach, consultant, and facilitator on sustainability programs, but have each unit commit some dedicated staff to their respective sustainability aspirations. To begin with, each College and CW Campus can allocate 0.5 FTE person as a director of sustainability programs for the unit. That could grow to a full FTE in the next year or two. Each unit could also develop a Sustainability Council for the unit that brings together faculty staff and students to think through and develop their own sustainability programs and integrate them in the unit's Strategic Plan

We also view sustainability as a way to open new sources of funding particularly from Foundations, Philanthropists and through crowd funding. As a Research I University, Penn State has excelled at gaining research funds from public science funders such as NSF, NIH, and other government agencies. We have been less successful with gaining funding from private foundations who generally like to fund applied work and community solutions. Sustainability is an arena, in which foundations are particularly active. Our ambitious sustainability plan could be very attractive to them. Of course, gaining funding from foundations, philanthropists, and other non-traditional sources will require developing a good funding strategy in collaboration with our Penn State development team.

V. CONCLUSIONS

We are living in what scientists are calling the Anthropocene era. Humans are impacting nature at a massive scale and disturbing basic hydrological, carbon, and nitrogen cycles. This period is characterized by planetary scale risks and sustainability challenges. Many of these challenges, such as climate change, biodiversity decline, provisioning food water, and energy for all, urbanization and planetary health, receive daily media attention. They are also areas in which Penn State has special intellectual expertise. As a land-grant university, it is also our responsibility to help Pennsylvania deal with these historic challenges. With strong assets in agriculture and food, engineering and materials, earth and mineral sciences, business, law, arts and humanities, we are uniquely well positioned to lead in solving real and urgent problems facing humanity.

For Penn State to excel in sustainability, it has to adopt a “systems view” and integrate sustainability across all levels from strategic to operational, in all its colleges, campuses, operations, and communities. In short sustainability needs to become a basic organizational function that invokes systemic changes in our research, curriculum, operations, student life and community involvement. Our solutions should target both our own campuses and also the entire Commonwealth of Pennsylvania. By making Penn State and its communities sustainable we will de facto bring sustainability to the Commonwealth.

This ambitious vision for sustainability at Penn State is well aligned with Penn State’s Strategic Plan, our aspiration of being the Energy University, and with the United Nations accepted global Sustainable Development Goals. It will evolve incrementally, and in collaboration with all the units of the University. This document articulates a Work Plan to help accomplish this vision. We invite all our colleagues across the University to collaborate with us in shaping this plan and implementing it.

Appendix

Table Penn State Strategic Plan Themes Illustrated across SDGs

SDG / Penn State-SP Themes	Stewarding Natural Resources	Health & Wellbeing	Driving Digital Innovation	Transforming Education	Advancing Arts & Humanities
1. Eliminate Hunger	Roots Lab	Lion Pantry	Plant Village	Affordable Greenhouses in Africa	
2. Eliminate Poverty		Center for Rural Health			
3. Health & Well-being	Landfill Diversion from the Nursing Simulation Lab	Student Farm Center for Rural Health College of Nursing Simulation Lab Zero Waste Initiative Work @ the Center for Infectious Disease	Active Lions	Active Lions	Plastic Entanglements @ the Palmer Museum of Art
4. Inclusive Equitable Education				COE increasing women in class to 50 percent Sustainable Development track in Education and Public Policy Mark Brennan's UNESCO work on Youth Education	
5. Gender Equality Empower Women				COE increasing women in class to 50 percent	Stand Up Awards The Weiss Chair for the Humanities
6. Water & Sanitation	Wastewater Beneficial Reuse Project Living Filter EcoMachine Municipal Separated Storm Sewer System (MS4) working group			SCC Projects for Ferguson Township Living Filter RF Project	SEEP @ the Woskobb Gallery

7. Sustainable Energy	Penn State Energy Plan PA's Solar Future Penn State Renewable Energy Program		Philadelphia Navy Yard EV PV Station at OPP	Renewable Energy and Sustainable Systems Sustainable Communities Collaborative American Collegiate Wind Energy competition Race to Zero Philadelphia Navy Yard SCC Projects in Ferguson Township, Corl Street Elementary, and others	Storied Images: Marcellus Shale; Marcellus Shale Documentary Project; Shale Play
8. Econ Growth, Employment			Penn TAP LaunchBox	Smeal College Sustainability Plan	
9. Resilient Infrastructure, Industrialization, Innovation	MRI Larson Transportation Institute				Philadelphia Navy Yard
10. Reduce Inequality		Fracking, Human Rights, and the Struggle for Representation		Paul Robeson Cultural Center's ongoing programming Center for Education and Civil Rights Weis Chair of the Humanities ongoing work Rock Ethics Institute ongoing support of ethics education Programming of the Center for Global Studies	Critical Philosophy of Race @ Rock Ethics Institute Truth and Reconciliation Project @ Humanities institute Ask an Ethicist
11. Resilient Cities, urbanization	Race to Zero			Race to Zero	
12. Sustainable Consumption and Production	Student Farm				Plastic Entanglements @ the Palmer Museum of Art Deployable Makerspace Classrooms

13. Combat Climate Change	ESSC; ENRI; Community Solar on State; PA Solar Future	Waste Mgt, Energy Plan	SCRiM Polar Center research Antarctic Icesheet Mapping in EMS	Power Dialogue SCRiM summer programs Climate Change and Conflict Management Race to Zero CAUSE courses in Peru and Alaska	Climate Stories Mark Ballora's & Jenni Evans' hurricane sonification project Truth Project @ Humanities Institute Climate Change. Climate Justice film festival Ask an Ethicist
14. Conserve and SD Oceans					
15. Sustainable use of Ecosystems	Sustainable Watersheds Numerous IEE funded projects			Parks and People	
16. Peace				Talking Together About Guns Programming in School of International Affairs and Center for Global Studies	Weis Chair of the Humanities

References:

McKinsey Center for Business and Environment, Focused acceleration: A strategic approach to climate action in cities to 2030, November 2017.