University of Hawai‘i Office of Sustainability
2016 Annual Report
January 26, 2017

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# Table of Contents

- Executive Summary ............................................................................................................. 3
- 2016 Accomplishments........................................................................................................... 4
- 2016 Strategic Review........................................................................................................... 6
- Energy ...................................................................................................................................... 8
  - Office of Energy Management ........................................................................................ 8
  - Net Zero Energy .............................................................................................................. 9
- Energy Data Management ................................................................................................ 10
- Energy Efficiency ............................................................................................................... 12
- Renewable Energy Portfolio ......................................................................................... 14
- Social Initiatives ............................................................................................................... 18
- Green Revolving Fund (GRF) ......................................................................................... 18
- Sustainability Curricula ................................................................................................. 20
  - S-Designation ............................................................................................................. 20
  - Next Steps (Future Opportunities) ........................................................................... 21
- Engagement ..................................................................................................................... 23
  - Campus Engagement ................................................................................................. 24
  - Media Engagement ..................................................................................................... 27
  - Community Engagement ............................................................................................ 29
- Conclusion ......................................................................................................................... 31
Executive Summary

The University of Hawai‘i Office of Sustainability (UHOS) was established in February 2015 to develop and lead systemwide sustainability programs. Given the escalating impacts of climate change worldwide and the need to develop a solution, the University of Hawai‘i (UH) is presented with an opportunity to capitalize on its unique location and rich cultural heritage to offer world-class sustainability studies and develop a comprehensive sustainability program.

Since its inception, UHOS has worked to support and enhance campus sustainability efforts and coordinate the sharing of information and resources across the UH System. The office also serves as a hub to highlight the many exciting sustainability efforts underway and encourage sustainable behavior in our community.

2016 Objectives

- **Energy:** reduce energy consumption and accomplish net zero energy goals
- **Curricula:** catalyze the rapid diffusion of sustainability across existing curricula
- **Engagement:** organize campus and community events to promote interest in sustainability

Recommendations

- Leverage sustainability as a platform to integrate Academic and Facilities Plans.
- Establish a permanent position for the Systemwide Sustainability Curriculum Coordinator.
- Work with the State Legislature to provide seed funding for the systemwide Green Revolving Fund, which is dedicated to renewable energy and self-funded energy efficiency investments (properly managed, this seed funding would effectively be a one-time grant into perpetuity).

Conclusions

- The reflection of our sustainability values in physical plant infrastructure fosters a vibrant campus environment and culture.
- Significant worldwide demand exists for sustainability programming in teaching and research.
- UH is taking necessary action to improve its sustainability programming and meet the demand for sustainability education.
2016 Accomplishments

Energy, Operations and Planning

- Campus sustainability plans drafted
- Campus sustainability plans: integration with Hawai‘i Papa O Ke Ao + Strategic Plans (KCC only, recommend other campuses follow suit)
- Office of Energy Management established
- Net Zero strategy formulated
  - Energy data management: 33 UH Mānoa buildings reporting energy use in real time
  - Energy efficiency: Energy Savings Performance Contract under development; Green Revolving Fund established
  - Renewable energy: 2MW+ new photovoltaic contract awarded
  - Social Initiatives: Community Based Social Marketing pilot project launched

Curricula

- ‘Ike Hawaii / Sustainability hui: Articulate core cultural values for sustainability
- Sustainability Curriculum Council: 2020 Curriculum Challenge launched
- S-Designation benchmarking identifies 200+ sustainability courses across UH
  - 45 courses identified at UH Mānoa
  - SUST course descriptor code established to help students easily find courses
  - Systemwide sustainability certificate equivalent to minor under development

Engagement

- 4th Annual Sustainability Summit #HSHE16
- 2016 President’s Green Initiative Awards awarded
- UH Mānoa electric vehicle drive events¹
- Student Engagement at the International Union for Conservation of Nature (IUCN) World Conservation Congress
- “Make the Ala Wai Awesome” student challenge launched
- UH students announce World Youth Congress 2017
- UH partners with Kamehameha Schools and Hawai‘i Green Growth to create student pathways to participate in statewide Green Workforce and Education sustainability measures project
- Graduate Assistantship created in partnership with the College of Social Sciences

¹ Seven electric vehicles available for test drives including: two Nissan Leaf, two BMW i3s, one Chevrolet Volt, one Ford Fusion Energi, and one Ford C-Max Energi. Over 42 participants that took at least 64 test drives in Spring, and approximately the same numbers engaged at the second campus EV drive events held in Fall 2016.
• IUCN engagements
• Earth Day 2016 events across multiple campuses
• VERGE Clean Energy Conference panel
• “Rethinking Education” Watada lecture series
• “Emerging Professionals Showcase” U.S. Green Building Council series
• “Hawaii – Germany Clean Energy Symposium”
• “Before the Flood” climate change documentary and panel discussion
• Fall site visits to UH campuses
2016 Strategic Review

Sustainability is defined in UH Executive Policy 4.202 as “serving the needs of the present without jeopardizing the needs of the future.” It has been further defined by a new word introduced into the Hawaiian Lexicon by Dr. Larry Kimura, Associate Professor of Hawaiian Language, at a gathering convened at UH Hilo by UH President David Lassner on February 16, 2016:

MAUŌ: “The perpetuation of well-being.”
The Hawaiian word mauō, for sustainability, is made up of two basic words; mau, stability, unbroken continuity, and ʻō, enduring in a heathy state. This new Hawaiian word was coined by the Hawaiian Lexicon Committee in 2016.

Formerly, there was no need for the word mauō because it was a normal part of Hawaiian life. Today, it is critical that we distinguish between what is sustainable and what is not.

Native Hawaiians created a vibrant and flourishing society while living within the archipelago’s ecological boundaries, and in kinship with the natural world. This rich cultural heritage and traditional knowledge of sustainability as a “lived practice” guides the University of Hawaiʻi as we serve our island communities in the realm of sustainability. The meeting of ancestral knowledge and modern empirical science offers a rich nexus that the University of Hawaiʻi is uniquely positioned to explore.

To accomplish these goals, in 2016, UHOS focused on three primary objectives:
1) Energy: reduce energy consumption and accomplish net zero energy goals
2) Curricula: catalyze the rapid diffusion of sustainability across existing curricula
3) Engagement: organize campus and community events to promote interest in sustainability

Energy Management
The Office of Energy Management (OEM) was established in July 2016. OEM’s strategic priorities focus on improving UH’s energy data management, energy efficiency, and expanding our renewable energy portfolio and social initiatives to achieve our net zero energy goals. Since July, we have made significant progress on submetering at the Mānoa campus and have increased our renewable portfolio through the award of a 2MW photovoltaic (PV) project on the Mānoa Campus and the award of a PV project which will generate 47% of the Institute for Astronomy mid-level Mauna Kea facility’s energy needs. We are also developing a large-scale Energy Savings Performance Contract (ESPC) at the UH Mānoa campus to upgrade energy efficiency infrastructure. OEM has also secured over $58,000 in energy efficiency rebates and continues to develop mechanisms to track, harness and reinvest savings from efficiency improvements.
Sustainability Curricula

Surveys have shown that students want to take sustainability courses at UH, but it is not readily apparent for students to discern which course offerings cover sustainability topics. We also know that faculty in various disciplines are teaching sustainability in their courses to remain relevant; however, we have not institutionalized these courses into certificate, minor or degree granting programs. The focus in 2016 was to begin socializing, systemwide, the framework for developing sustainability studies – beginning with documenting existing sustainability courses across disciplines and establishing metrics for easy identification. With this, all recognized sustainability courses will be designated and updated in the course catalogs over time.

Campus and Community Engagement

Campus and community engagement is critical to drive the momentum to rebrand UH as a recognized leader in sustainability, and serves the dual purpose of outreach and the marketing of our sustainability efforts internally and externally.

In addition, UHOS has continued to participate in the statewide sustainability planning efforts currently underway, including representing UH at the statewide coalition of public, private and community organizations that are working to establish goals and metrics to track and measure our statewide progress in six key areas: Clean Energy, Waste Reduction, Natural Resource Management, Local Food, Smart Sustainable Communities, and Green Workforce and Education.

Hawai‘i has received international attention for its innovative approach to implementing appropriate sustainable development goals at scale and with broad, diverse and large-scale partnerships. The University of Hawai‘i continues to play a key role as a provider of subject matter expertise, and as a core partner coordinating with government agencies, the private sector, and community groups.

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2 In a survey of 194 UH students:

- More than 50% feel that the university does not currently offer enough sustainability courses
- 97% believe that Sustainability should be incorporated into more current and future courses at UH Mānoa.
- 92% indicated that they would take a Sustainability-focused course.
- 73% believe that UH Mānoa should offer a BA in Sustainability.

3 Visit the State of Hawai‘i’s online Sustainability Dashboard, and Hawaii Green Growth website for more information.
Energy

Office of Energy Management

Tracking the trend in higher education, UHOS established the UH Office of Energy Management (OEM) with the hiring of Miles Topping in June 2016. He is a UH Mānoa College of Engineering graduate with over eighteen years of experience in various roles in the design, building, and implementation of electronics, solar and storage systems. Miles brings a wealth of demonstrated knowledge and dedication toward pursuing our goal of net zero energy.

OEM will continue to build upon the coalition of key internal and external stakeholders launched in 2015, which includes Planning and Facilities staff from all campuses, the electric utility, Hawai‘i Energy, the Public Utilities Commission, the Energy Excelerator, Blue Planet, the Ulupono Initiative, and the Hawai‘i State Energy Office. These groups have been working together to develop a Strategic Energy Partnership. This Partnership will help UH develop a comprehensive strategy to reduce energy consumption across the campuses.

UHOS is building a dedicated OEM team to design and implement UH’s Net Zero Energy strategy to achieve our Act 99 (Session Laws of Hawai‘i 2015) mandate “to become net-zero with respect to energy use, producing as much (renewable) energy as the system consumes across all campuses by January 1, 2035.”

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[Image: Strategic priorities for the UH Office of Energy Management.]

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Net Zero Energy

Net Zero Energy is achieved when an organization’s total energy consumption is equal to the total renewable energy provided (via on-site generation or purchased from certified renewable energy providers).

UH further defines Net Zero energy consumption and production as follows:

**Net Zero Energy Consumption** is energy consumed by UH or energy consumed by UH controlled facilities. This includes energy consumed as part of the infrastructure such as parking lot lighting, building air conditioners, building lighting and electrical loads, as well as energy consumed by tenants and vendors, including those that have a dedicated utility meter that pay the utility directly.

**Net Zero Energy Production** is energy generated directly by UH or generated by UH controlled facilities. This includes generation assets owned by UH, independent of their physical location, such as those owned by a third party but located on UH controlled lands (e.g., PV Power Purchase Agreements), and utility-scale generation on UH owned lands. This includes all forms of generation to include renewables and PV as a preferred source, but could include hydrogen, bio fuels, or other renewable sources.

These definitions broaden the suite of options available to UH to pursue net zero energy, and allow for collaboration with the utility and other stakeholders to develop large-scale renewable energy projects on UH-controlled lands whilst ensuring that our resources are not pulled away from our core educational mission (for more details, see the Renewable Energy Portfolio section below).
UH’s Net Zero Energy Dashboard tracks renewable energy generation relative to the 2015 baseline of energy consumption systemwide. Development of utility-scale solar projects will be necessary to achieve our mandate.

**Energy Data Management**

Gaining control over the accuracy and accessibility of UH energy data is the first critical step for effective energy management. Accurate and timely data allows for greater transparency of energy usage and billing to optimize innovative energy financing strategies such as Energy Savings Performance Contracting (ESPC), Green Revolving Funds (GRF), Public-Private Partnerships (P3) and more, as well as move our institution towards a uniform and transparent system of monitoring and incentivizing energy performance for all UH stakeholders.

To facilitate energy data management, 69 electrical sub-meters have been installed across 33 buildings in 2015-2016 on the Mānoa campus (representing approximately 38% of the campus’ overall energy usage) and integrated with the Blue Pillar “Aurora” Energy Management System (EMS). The EMS will allow the energy management office to not only capture systemwide usage data and flag comparatively high usage, but will also facilitate predictive analysis and ultimately automated demand response (including the scheduling of HVAC systems and lighting).

This innovative pilot project is the result of a collaboration with the Energy Excelerator, which is structured utilizing a cost-share approach. The Energy Excelerator and its partners provided a combined $1,000,000 in upfront costs to deploy their technology at the Mānoa campus. The pilot must demonstrate its technical and financial viability to the university prior to any required financial commitment from UH.
The EMS not only integrates these sub-meters but also pulls in information from the existing 5 HECO meters, 23 Building Automation Systems (BAS), and 7 separate PV generation sites on the Mānoa campus, giving OEM access to and control of real-time energy consumption and generation data.

On January 6, 2017, the Phase 3 sub-metering project design was completed for an additional 80 meters across an additional 65 buildings. Once installed, these meters will also be integrated with the Blue Pillar EMS. The map below shows which buildings are sub-metered:

In addition to integrating the energy data for the Mānoa campus, the Blue Pillar EMS is integrating data from the other nine campuses, pulling in data from their meters, BAS, and renewable energy systems.

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4 BAS provide control over the building HVACs and chilled water loops.
OEM is also working with HECO and multiple UH fiscal offices to reconcile the multiple versions of billing information which currently exist, to develop succinct, consistent and more accurate reporting.

**Energy Efficiency**

Energy efficiency investments offer the strongest return on our investment and most immediate cost savings, and are directly impacted by our ability to access and manage our energy data. Efficiency includes both efficient systems, and efficient use.

**Efficiency in New Construction and Major Renovations**

New Building Design Performance Standards (BDPS) have been developed to guarantee the equivalent of LEED Silver certification or higher if followed. The BDPS has been published and is in the process of being adopted as part of the Architectural and Engineering (AandE) design standards for UH planning and design teams. UH will require design consultants and contractors to adhere to the BDPS for all major projects going forward.

BDPS applies the best practices from LEED and Green Building and adjusts for a tropical climate. It specifies that energy modeling and simulation be conducted at various design and submittal stages to verify that the design iterations maximize energy efficiency and indoor environmental quality.

For example, modern Heating Ventilation and Air Conditioning (HVAC) systems equipped with Variable Frequency Drives (VFDs) and smart automation utilize a suite of sensors to detect not only if anyone is in the space, but also how much carbon dioxide is being exhaled and the heat load being generated to ensure the appropriate amount of air exchange or cooling.

Mixed mode thermal comfort, configurable spaces, and thoughtful space utilization can allow buildings with unoccupied office and classroom spaces to be shutdown during holidays, weekends and evenings. Since HVAC energy loads are typically the largest in a building, smart building layouts with holistic HVAC designs are key to energy efficient performance in new building designs and major renovations.

**Efficiency in Existing Spaces**

We have contracted with a space utilization consultant (MK Think) to create a transparent understanding of how existing spaces are utilized. Analysis of our registrar information, space utilization index and deployment of low-cost occupancy sensors will help us understand how to utilize existing spaces more efficiently, provide insights into actual (vs. scheduled) space utilization that will support data-driven decision making for facilities management which is better integrated with academic and research
programming, and support design optimization and scheduling of energy efficient HVAC and lighting systems.

Sample space utilization study conducted by MK Think at Golden Gate University (GGU).

This analysis revealed that existing classroom inventory was underutilized, which allowed the campus to adjust its physical inventory and right-size its classroom inventory to reduce its classroom space by over 14,000 square feet. Alternatively, GGU could have opted to adjust class schedules and utilize existing rooms more intensely through rescheduling to make more efficient use of existing space.

This space utilization data will also inform the large-scale Energy Savings Performance Contract (ESPC) going out to Request for Proposal (RFP) in early 2017 to Design, Build, Finance, Operate, and Maintain (DBFOM) the energy efficient infrastructure upgrades discussed above for Mānoa campus.

The DBFOM approach to energy performance contracting differs from the typical Design-Build (DB) approach State agencies have utilized to execute their own ESPCs with varying degrees of success.

This innovative approach has been developed with input from some of the nation’s best-performing universities\(^5\) to take advantage of lessons learned nationally. This will

\(^5\) Most notably, UC Irvine and UC CalTech, who have received multiple awards from the US Department of Energy, the Environmental Protection Agency, and the State of California for their leadership in reducing energy consumption.
allow UH to structure its ESPC as a long-term partnership with the right private-sector partner(s) to improve energy performance, reduce energy costs, and bolster our operational capacity to operate and maintain new energy infrastructure and equipment.

In addition to increased efficiency, energy savings realized from energy efficiency investments can be applied to Deferred Maintenance (DM), which can help to address UH Mānoa’s significant DM backlog. From this perspective, the Mānoa campus is uniquely positioned to leverage its aging energy infrastructure to modernize its facilities and transform its energy performance from lagging to leading.

**Renewable Energy Portfolio**

**UH Mānoa**
This year, the UH system has awarded a 2MW Solar PV Power Purchase Agreement (PPA) which will construct a PV canopy over the parking structure on Dole Street. This PPA is estimated to generate more than $11 million dollars in avoided energy costs over the next twenty years. In addition, it will provide shade for the top parking deck and be a prominent visual symbol of the UH commitment to renewable energy.

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Wendell Brase (UCI), John Onderdonk (CalTech) and their Energy Management teams have been very generous with their time in sharing lessons learned and best practices that have transformed their own institutions’ energy performance.
Institute for Astronomy

The contract for an additional 100kW Net Energy Metering (NEM) PPA for the Institute for Astronomy’s (IFA) mid-level Maunakea facility was awarded and is currently in the final permitting stages. This system is estimated to offset 47% of the facilities’ utility usage and sends a clear message about UH’s commitment to renewable energy to the global community of astronomers.

The IFA PV system is one of the last systems to be permitted under Hawai‘i Electric Light Company’s NEM program, which allows this facility to sell excess energy generated during daylight hours back to the utility for additional energy cost savings.
UH West O‘ahu

OEM continues to work closely with Hawaiian Electric Company (HECO) and other partners to develop the proposed UH West O‘ahu mauka lands’ solar PV project.

The initial feasibility study conducted in 2015 has been further refined to incorporate feedback from preliminary financial and site analyses to exclude the areas which would be problematic for renewable development:

- All lands with an ‘A’ Land Study Bureau classification
- Pu‘u Kapua‘i Open Space (79 acres)
- 100 year flood and roadway easements
- Small parcels of PV which would be impractical to develop
- Land sloping more than 15%
- North facing land with solar aspects not between 270 and 90 degrees.

Further analysis shows potential 50MW solar PV generation from UH West O‘ahu mauka lands. Work to address fiscal and regulatory issues facing the project is ongoing.

Based on the above information, topographical contours, and required geologic core sampling sites, HECO is conducting an updated financial analysis to calculate development costs and estimated costs per kWh to both the utility and customer. This analysis will inform UH’s next steps to develop the site for large-scale solar power generation.
UH West O’ahu campus also brought online 500kW of PV which will offset 10-15% of utility purchased power:

![Solar PV System at UHWO](image)

This 500kW ground mount Solar PV system at UHWO began operation in December 2016.

**UH Hilo**

UH Hilo doubled its PV portfolio and generated approximately 500kWh last year (as opposed to approximately 100kWh the previous year).

This campus tracks the avoided energy costs generated by this system, and has successfully established a Green Revolving Fund, which has harnessed over $278,666 of energy savings to date. These savings are earmarked for reinvestment into an exterior bi-level LED lighting conversion project to yield additional energy savings that are estimated to repay the initial investment within six years.
Social Initiatives
To achieve success, we must also focus on influencing the behaviors of our campus community. When coupled with the University’s investment in energy efficiency, this maximizes the overall impact on our sustainability goals. UHOS is focused on being a catalyst for cultural change.

The **short-term** strategy is to develop a communication and outreach plan that is incorporated into the execution of energy-efficiency upgrades. The message will highlight the University’s energy conservation efforts and invite our community to contribute their part by changing habits and behaviors. Current plans are to introduce this concept with UH Mānoa’s 2MW Solar PV parking lot rooftop canopy and the William S. Richardson Law Library LED retrofit.

The **mid-term strategy** is to create incentives and accountability at the departmental level. This has been shown to be highly effective in driving energy efficient behaviors. Being able to track and monitor energy use down to the building level and beyond is needed (and in progress) in order to create accountability. Various incentives can then be designed to reward energy efficient behaviors.

The **long-term strategy** is to transform campus culture through campus modernization efforts that reflect UH’s sustainability values through its built environment. Through incentive programs, compelling academic and research programming, and rich campus, community and cultural engagement, UH can be an inspiring destination for sustainability teaching, learning, and research.

Green Revolving Fund (GRF)
The successful GRF pilot implemented at UH Hilo has demonstrated that the technical and accounting infrastructure needed to track, harness and reinvest energy savings into additional, cost-reducing sustainability projects is readily available.

Since fiscal year 2012, UH has received over $1,000,000 in energy efficiency rebates for more than 87 energy efficiency projects that have yielded almost $8,000,000 in energy savings. However, UH has not established a policy nor institutionalized a process to reinvest savings in additional sustainability and energy efficiency investments. In a step toward this effort, a GRF was established to serve as a mechanism for energy projects with a calculated simple payback period of less than ten years. In return, all or a portion

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6 [https://betterbuildingssolutioncenter.energy.gov/implementation-models/tying-energy-costs-building-occupants](https://betterbuildingssolutioncenter.energy.gov/implementation-models/tying-energy-costs-building-occupants)
of any energy savings associated with the project will be paid back into the GRF to fund future projects.

A detailed lighting audit of eight buildings on UH Mānoa’s lower campus was conducted last year by two UH Mānoa undergraduate students working closely with Hawai‘i Energy lighting engineers. As set forth in the table below, over 6,000 lighting fixtures were identified for replacement that would yield an estimated $200,000 or more in energy savings a year. After rebates these projects were estimated to yield a simple payback period of 3.8 years.

### SUMMARY TABLE (Option 2)

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Effective Utility Energy Rate (S/Wh) $ 0.17

Summary of lower campus lighting audit and fiscal analysis of LED retrofit conducted by two UH Mānoa undergraduate students working closely with Hawai‘i Energy lighting engineers in 2015.

GRFs have been implemented across the country in higher education with success. This is primarily because it utilizes the cheapest form of financing. Additionally, the ability to track, harness and reinvest savings via a GRF at the campus level can provide a strong incentive to empower campus communities to identify and develop their own energy savings projects by making available financial capital that is tied to clearly defined energy performance measures.

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7The Hawai‘i Energy Fellows program directly increased our operational capacity to implement pilot projects and delivered two valuable projects: 1) lower campus lighting audit depicted above, and 2) Community-Based Social Marketing (CBSM) pilot project in Hawai‘i Hall at UH Mānoa.
Sustainability Curricula

Surveys have shown that UH students are seeking studies in sustainability. Every campus has stand-out faculty engaged in teaching and research around sustainability; however, it is difficult for students to discern which courses cover sustainability topics. If UH is able to meet this currently underserved need it could expand its student body. Offering courses that are relevant and equip our graduates with the requisite knowledge, skills and experiences to succeed in a world of increasingly complex and rapid change is core to UH’s mission.

S-Designation

In Spring 2016, the Systemwide Sustainability Curriculum Coordination Council (SSCCC) set an internal goal to double the number of sustainability courses offered at UH campuses by 2020.

In Fall 2016, UHOS was able to negotiate a Teaching Equivalency to hire Dr. Krista Hiser as Interim Systemwide Sustainability Curriculum Coordinator to conduct a systemwide benchmarking survey of existing sustainability curricula, courses, and programming as a first step towards achieving that goal.

For over ten years, Krista has worked with UH faculty members on the development of the S-Designation, a designation which allows students to easily identify sustainability courses and supports faculty to identify their courses as sustainability-focused or sustainability-related.

The process of working with faculty from other disciplines who are teaching or are interested in teaching sustainability creates a friendly, ongoing interdisciplinary dialogue that serves the additional functions of fostering peer-to-peer faculty professional development and ensuring curricular coherence, transparency and rigor.

By working with the SSCCC, as well as directly with the appropriate faculty sustainability committees established at individual campuses, UHOS has created the S-Designation Handbook, a living document that is designed to assist UH campuses to adapt and

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8 In a survey of 194 UH students:

- More than 50% feel that the university does not currently offer enough sustainability courses
- 97% believe that Sustainability should be incorporated into more current and future courses at UH Mānoa.
- 92% indicated that they would take a Sustainability-focused course.
- 73% believe that UH Mānoa should offer a BA in Sustainability.

9 Dr. Hiser is a Professor of Composition and the Faculty Service and Sustainability Learning Coordinator at Kapi'olani Community College, where she team teaches the learning community course: "Decade Zero: Understanding Climate Disruption," and serves on the Faculty Senate Standing Committee on Sustainability.

10 Sustainability-focused = 60% or more of overall course content teaches about sustainability.

11 Sustainability-related = one or more class teaches about sustainability over the duration of the course.
implement a Sustainability Designation for courses integrating sustainability across the curriculum.

The systemwide benchmarking survey conducted this year identified over 200 sustainability courses taught across all ten campuses, with many more courses awaiting formal vetting by the appropriate campus faculty to receive their S-Designation. In addition, UHOS is working to support each campus in developing a committee and process that works for their campus; the S-Designation criteria are thus consistent across the system, but also uniquely applied on each campus.

UH Mānoa has identified 45 courses as sustainability-focused via a detailed course catalog audit conducted by the campus Sustainability Curriculum Committee. UH Mānoa’s Office of the Vice Chancellor for Academic Affairs (OVCAA) is currently in the process of establishing a brand-new SUST course subject code that would be housed within the proposed UH Mānoa Sustainability and Resilience Institute; the 45 courses identified thus far will be cross listed as SUST courses and could appear in course catalogs as early as Spring 2018, so that students may easily identify sustainability courses offered at UH Mānoa.

UHOS continues to work with other UH campus registrars to develop mechanisms for students to easily identify sustainability courses in their course catalogs.

**Next Steps (Future Opportunities)**

1. **Expanding Sustainability Course Offerings**
   UHOS will continue to work with all campus stakeholders, including faculty and students, to expand the number of course offerings in sustainability. These efforts will require the seamless coordination between disciplines, colleges, and campuses. To support this, we recommend the establishment of an administrative vehicle that compliments, supports and enhances the work of the academic departments and effectively functions as a neutral territory that can amass resources to be accessed by multiple departments to further their work.\(^\text{12}\)

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\(^\text{12}\) UH Foundation has indicated significant philanthropic interest in raising funds to support sustainability initiatives at UH.
The proposed UH Mānoa Sustainability and Resilience Institute can provide administrative support for multidisciplinary programs in sustainability, as well as supporting the non-operational components of EP 4.202 (Sustainability in Curriculum, Research, Engagement and Cultural Connections).

This administrative vehicle can function as a backbone organization\(^{13}\) that provides coordination capacity and ensures the fair distribution of resources between departments, to:

1. **Equip** our **students** with **sustainability competencies**, and
2. **Direct research** towards **solving** the **complex challenges** of **sustainability** faced by our communities locally and abroad.

Our work this year brought together dynamic groups of engaged faculty who are teaching sustainability from the leading edge of their disciplines. The interaction between faculty and students (in classrooms, labs, on campus, in the field, and electronically) is the heart of higher education, and sustainability curriculum initiatives help faculty to work creatively and collaboratively around institutional barriers, building new networks for **thinking**, **teaching**, **researching**, and **learning**.

**2. Systemwide Sustainability Certificate**

As UHOS has met with sustainability faculty at all the campuses since commencing its sustainability curriculum benchmarking survey, there has been one question that is consistently asked: “**What do all of these S-Designation courses add up to?**”

Now that a mechanism exists to identify (and potentially redesign) existing courses to qualify for the S-Designation, faculty can develop a systemwide sustainability “certificate equivalent to a minor”\(^{14}\) that would appear on students’ transcripts.

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\(^{14}\) Modelled after the Marine Options Program, UH’s only existing systemwide certificate equivalent to a minor.
Individual departments can then develop additional sustainability certificates, undergraduate/postgraduate programs, and research initiatives.

In this manner, we can catalyze a rapid diffusion of sustainability across curricula, and provide students with a basic understanding of not only climate change science and impacts, but also our island culture’s unique role.15

As UH articulates its own locally and culturally appropriate core competencies of sustainability, a tandem strategy to develop a focused major in Sustainability (building on what currently exists as Interdisciplinary Studies) can be developed. Once a sustainability major program is offered by UH, the “certificate equivalent to a minor” can begin to appear as a sustainability minor on student transcripts.

3. Institutional Partnerships

Public institutions of higher education across the nation are facing similar challenges. Arizona State University (ASU) has emerged as a forward-thinking institution for innovation and sustainability.16 By making the commitment in the discipline of sustainability, ASU has more than doubled its enrollment since establishing its School of Sustainability in 2006.

ASU has recognized that UH is uniquely positioned to offer world-class studies in all aspects of sustainability. Recently, ASU has expressed interest in establishing institutional partnerships with the UH to explore the role of culture, environment, and economics in sustainable development. UHOS will continue to facilitate ongoing discussions and collaboration.

**Engagement**

Campus and community engagement are critical to driving the momentum to rebrand UH as a recognized leader in sustainability, and also serves the dual purpose of outreach and marketing our institutional sustainability efforts.

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15 **Sustainable Development Goal 4.7** – “By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture’s contribution to sustainable development”

16 Despite declining appropriations from a State Legislature that is reticent to accept the science of climate change, ASU has more than doubled its enrollment since establishing its School of Sustainability in 2006.
Campus Engagement

UHOS hosted fifteen official #UHSUSTAINABILITY events as part of its overall outreach strategy, directly engaging over 500 people through our annual summit, campus site visits and events, and working sessions.

Peer-to-peer learning amongst students at the 4th annual Student Sustainability Summit held at UH Mānoa on March 12, 2016. Over 20 students from multiple campuses attended.

4th Annual Hawai‘i Sustainability in Higher Education Summit (#HSHE16)

This annual event allows UHOS to strategically focus systemwide sustainability efforts, facilitates the sharing of best practices between campuses, and drives momentum for the campus sustainability action agendas each year.

In 2016, the summit focused on four strategic areas:

1. Strategic Energy Management
2. Student Leadership
3. Campus Sustainability Plans
4. Sustainability Curriculum Coordination

The two-day intensive working sessions convened almost 170 staff, faculty and students from all ten campuses to advance progress in these key areas. Featured speakers and workshop hosts included community and student leaders as well as leading practitioners in energy management, sustainable design and sustainability education.

The information gathered over these two days is vitally important to setting the action agenda for the working year, allowing us to leverage limited resources for maximum impact and results.

For example, UHOS was able to convene a 2-day Strengths, Weaknesses, Opportunities, Threats analysis on Strategic Energy Management with representatives from all UH campuses’ facilities departments and key private and public sector partners including: the National Renewable Energy Laboratory (NREL), the International Facility Management Association (IFMA), Hawai‘i Energy, UC Irvine, Johnson Controls, Trane Engineering, and the Hawaiian Electric Companies.
Campus Sustainability Committees gathered to share their draft campus sustainability plans with each other in working sessions facilitated by Patrick Thibadeau, one of the nation’s leading architects and co-developer of the Zero-Plus design framework.

Student leaders gathered to learn about effective strategies to engage with campus leadership and to organize student efforts, as well as continue to work towards establishing paid student positions in sustainability-related work and annual student sustainability leadership retreats.

Faculty gathered to think about how to leverage existing resources currently available across our campuses, and to craft a compelling vision of what sustainability education could look like at the University of Hawai‘i.

Student Support
When students are empowered to take on sustainability projects as extra-curricular activities, campuses become living laboratories ripe with opportunities to innovate and improve campus systems and facilities.

In 2016 UHOS supported 4 paid student positions, including:
- 1 UH System Student Sustainability Coordinator
- 1 UH Mānoa Student Sustainability Fellow\(^{17}\)
- 2 UH Mānoa Hawaii Energy Fellows \(^{18}\)

Additionally, UHOS’ first Graduate Assistant position was created in partnership with the College of Social Sciences, which will provide a tuition waiver for a graduate student to work in the UHOS office as a systemwide Student Sustainability Coordinator.

Beginning in January 2017, a UH Mānoa graduate student employee will help UHOS develop additional paid student sustainability fellowships and internships that serve to

\(^{17}\) (in partnership w/ UH Mānoa Office of Vice Chancellor for Student Affairs)  
\(^{18}\) (in partnership w/ Hawaii Energy)
bolster UHOS’ operational capacity while enhancing participating students’ learning experience through real-life problem solving on campus. UHOS continues to raise funds to develop additional paid student positions.

<table>
<thead>
<tr>
<th>Fund Source</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>President’s Green Initiative Awards</td>
<td>$30,000</td>
</tr>
<tr>
<td>Sustainability Summit Sponsorship</td>
<td>$40,000</td>
</tr>
<tr>
<td>HHFDC contract</td>
<td>$31,300</td>
</tr>
<tr>
<td>Ala Wai Challenge</td>
<td>$10,000</td>
</tr>
<tr>
<td>IUCN Attendance</td>
<td>$10,000</td>
</tr>
<tr>
<td>UHM School of Architecture</td>
<td>$10,000</td>
</tr>
<tr>
<td>LCC Campus Food Waste project</td>
<td>$2,500+</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>$133,800+</strong></td>
</tr>
</tbody>
</table>

*Summary of funds raised to support student efforts in calendar year 2016.*

**President’s Green Initiative Awards**

This [awards program](#) was launched in 2015 and distributed $30,000 in cash awards to students systemwide to support the implementation of student-led projects on campus or in the community, and for students to recognize peers who are demonstrating leadership in sustainability through extra-curricular activities:

- **$5,000** was awarded to [Christina Kaleiwahea](#) from Leeward Community College in recognition of outstanding leadership in sustainability on campus through her roles as a Leeward CC sustainability committee member, the STEM club president, a student government member and a dedicated community volunteer.
$5,000 was awarded to Jeff Kim, a UH Mānoa student, in recognition of outstanding leadership in sustainability on campus through his role as the Honolulu Chapter Leader of Citizens’ Climate Lobby and his tireless advocacy and work in the community for divestment from fossil fuels.

$10,000 was awarded to the Leeward Community College STEM club “E Ho’op’a’iapuni Kākou: An Integrated Approach to Resource Recovery,” in support of student efforts at LCC to develop a process to collect food waste on campus and turn it into high-quality, organic fertilizer and compost for the campus farm.

$10,000 was awarded to UH Mānoa School of Architecture PhD student Joey Valenti for his project entitled “Rescaling Urbanism” in support of applied research and design to develop an alternative framework of building by utilizing wood from the invasive albizia tree (F. moluccana), for the sustainability of our island and our planet.

The green project awards have catalyzed additional investment from and collaboration with other campuses, private sector partners, and state agencies. UHOS has been contracted by the Hawai‘i Housing and Finance Development Corporation (HHFDC) to support Joey to deliver a full-scale prototype by June 30, 2017 of one temporary housing unit based on his award-winning design.

Media Engagement
UHOS works closely with the UH Media Production team to ensure that sustainability is covered across UH. In addition to writing a number of articles, UHOS was involved with coverage of 126 sustainability-related stories in local print media, local news and TV in 2016.

<table>
<thead>
<tr>
<th>2016 Local News and TV Engagement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Story Count</td>
</tr>
<tr>
<td>Runtime</td>
</tr>
<tr>
<td>Calculated Publicity Value</td>
</tr>
<tr>
<td>Audience</td>
</tr>
</tbody>
</table>
Our most engaging, self-generated video story on Social Media was the HNL Tool Library, a project launched by UH Mānoa Sustainability Studies student Elia Bruno which has so far garnered 1,968 Reactions, Comments and Shares and 14,825 Views (as well as significant interest in local TV news, print and social media).

Elia was able to leverage a $600 microgrant\(^\text{19}\) he won in October 2015 to create Honolulu’s first tool library, which provides users access to more than 611 hand and power tools in exchange for a low annual subscription fee.

In addition to the extensive media coverage received, Elia was also able to establish a non-profit organization which has received in excess of $30,000 in funding thus far.

Total social media engagement numbers for sustainability-related video content produced by UH Media totaled 14 Stories for 77,618 Views and 6,231 Reactions, Comments and Shares.

<table>
<thead>
<tr>
<th>Date</th>
<th>Story</th>
<th>Reactions</th>
<th>Comments &amp; Shares</th>
<th>Views</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mar 7</td>
<td>UH Mānoa campus an accredited arboretum</td>
<td>1,968</td>
<td>16,000</td>
<td></td>
</tr>
<tr>
<td>Nov 30</td>
<td>Tool sharing made easy</td>
<td>1,634</td>
<td>14,825</td>
<td></td>
</tr>
<tr>
<td>Jul 27</td>
<td>House built out of cardboard wood might solve multiple sustainability issues</td>
<td>1,249</td>
<td>11,472</td>
<td></td>
</tr>
<tr>
<td>Apr 14</td>
<td>Students recover surplus food to feed homeless</td>
<td>528</td>
<td>22,858</td>
<td></td>
</tr>
<tr>
<td>May 6</td>
<td>Wildlife in peril in the Ohia forest</td>
<td>159</td>
<td>5,176</td>
<td></td>
</tr>
<tr>
<td>Sept 7</td>
<td>Make the Aiea Wa‘i Awesome Student Design Challenge</td>
<td>122</td>
<td>990</td>
<td></td>
</tr>
<tr>
<td>Dec 1</td>
<td>Electric vehicle donation helps UH reduce carbon footprint</td>
<td>105</td>
<td>1,646</td>
<td></td>
</tr>
<tr>
<td>Jan 22</td>
<td>Coral reef exports bridge science to public policy</td>
<td>105</td>
<td>799</td>
<td></td>
</tr>
<tr>
<td>Mar 8</td>
<td>UH Information Technology Center awarded LEED Gold</td>
<td>95</td>
<td>1,219</td>
<td></td>
</tr>
<tr>
<td>Feb 8</td>
<td>Seeding the future of the Ohia tree</td>
<td>77</td>
<td>1,078</td>
<td></td>
</tr>
<tr>
<td>Sept 13</td>
<td>UH Mānoa to host 2017 World Youth Congress</td>
<td>62</td>
<td>485</td>
<td></td>
</tr>
<tr>
<td>Mar 9</td>
<td>Students of the Student Sustainability Coalition of Hawaii</td>
<td>55</td>
<td>600</td>
<td></td>
</tr>
<tr>
<td>June 17</td>
<td>Lessons from the Lo‘i</td>
<td>37</td>
<td>265</td>
<td></td>
</tr>
<tr>
<td>Nov 9</td>
<td>First Net Zero Energy Buildings Unveiled at UH Mānoa</td>
<td>34</td>
<td>205</td>
<td></td>
</tr>
</tbody>
</table>

**TOTALS** 6,231 77,618

Summary of 2016 sustainability-related online video content produced by UH Media.

*Does not include people who shared content individually (i.e., did not share from UH posting)

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\(^{19}\) UH Mānoa Soup is a student-produced microgranting event that was reported on in the UHOS 2015 annual report.
Community Engagement

UHOS hosted, supported, or directly participated in eight major community engagement events, including Earth Week festivities which spanned the week of April 18-23, 2016 and included a variety of campus and community events at all ten campuses that is estimated to have engaged over 3,000 people.

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
<th>Campus / Location</th>
<th>Attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apr 18-22</td>
<td>Earth Day Festivities (Host: multiple campuses)</td>
<td>All Islands</td>
<td>3,000</td>
</tr>
<tr>
<td>Jun 21-23</td>
<td>VERGE Clean Energy Conference (Panelist)</td>
<td>Waikiki</td>
<td>30</td>
</tr>
<tr>
<td>Nov 9</td>
<td>Hawaii-Germany Clean Energy Symposium (Host)</td>
<td>UH Cancer Center</td>
<td>120</td>
</tr>
<tr>
<td>Jun 28-29</td>
<td>ALOHA+: Local Food Sustainability Dashboard (Facilitator)</td>
<td>Kohala</td>
<td>80</td>
</tr>
<tr>
<td>Jul 27-29</td>
<td>Sustainability Officers’ Retreat (Presenter)</td>
<td>British Colombia</td>
<td>70</td>
</tr>
<tr>
<td>Sept 5</td>
<td>&quot;Make the Ala Wai Awesome&quot; Student Design Challenge</td>
<td>All Islands</td>
<td>150</td>
</tr>
<tr>
<td>Oct 25</td>
<td>Pacific Building &amp; Trade Expo (Panelist)</td>
<td>Hawaii Convention Center</td>
<td>100</td>
</tr>
<tr>
<td>Dec 12</td>
<td>National Sustainability Curriculum Coalition webinar (Presenter)</td>
<td>Nationwide</td>
<td>100</td>
</tr>
<tr>
<td>Dec 14</td>
<td>USGBC Emerging Professionals Showcase (Host)</td>
<td>UH Mānoa</td>
<td>60</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td><strong>3,710</strong></td>
</tr>
</tbody>
</table>

Ala Wai Design Challenge

On September 5, 2016 UH President David Lassner announced the “Make the Ala Wai Awesome” Student Design Challenge at the International Union for Conservation of Nature (IUCN) World Conservation Congress. Open to students of all ages from around the world, the challenge seeks to rehabilitate a critical O‘ahu watershed that contains one of the nation’s most polluted bodies of water.

The design competition is linked to the Aloha+ Challenge, supporting the State’s sustainability goals in the areas of Natural Resource Management, Waste Reduction, Smart Sustainable Communities and Green Workforce and Education.

Since the challenge was launched, over 150 people registered to receive notification of the design brief when the competition opened to receive entries on January 9, 2017,
and the project has been featured in number of news stories in local TV, radio and newspaper media.

**Statewide Sustainability Policy Engagement**

Hawai‘i has received international attention for the *Aloha+ Challenge*, the innovative statewide approach to implementing locally and culturally appropriate sustainable development goals at scale and with broad and diverse multi-sector partnerships.

In 2016, UHOS continued to work closely with *Hawai‘i Green Growth*, the backbone organization coordinating much of the statewide sustainability planning efforts currently underway. UHOS represented UH at the statewide coalition of public, private and community organizations that are working to establish targets, goals and metrics to track and measure our statewide progress in six key areas: *Clean Energy, Waste Reduction, Natural Resource Management, Local Food, Smart Sustainable Communities*, and *Green Workforce and Education*.

UH continues to play a key role as a provider of subject matter expertise, and as a core partner, coordinating with government agencies, private sector, and community groups.

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**GREEN WORKFORCE & EDUCATION**

Coming in 2017

A memorandum of understanding signed by University of Hawai‘i, Kamehameha Schools and Hawai‘i Green Growth bridges educational missions and begins to create pathways for local students to help define and develop Hawai‘i’s statewide green workforce and education.

In November 2016, UH executed a new partnership with Kamehameha Schools to create pathways for our students to actively participate in the development of the state’s *Green Workforce and Education* goals in 2017, as well as to create an ongoing platform for students to continue to participate directly in statewide sustainability policymaking and implementation.

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20 Visit the State of Hawai‘i’s online Sustainability Dashboard, and the Hawaii Green Growth website for more information.
Conclusion

Given the escalating impacts of climate change worldwide and the urgent global interest in developing locally and culturally appropriate solutions, *UH is presented with a significant opportunity to capitalize on its unique location and rich cultural heritage to offer world-class studies in sustainability.* With support of the Board of Regents, the President, and other key leaders in our campus community, the University can serve as a global hub to develop pioneers that will rethink and reshape our role on the planet.