A YEAR IN REVIEW
2012-13

SUSTAIN ABILITY AT STANFORD

Stanford

“Universities like Stanford have an obligation to educate the sustainability leaders of tomorrow. So we must bring the rigor of academic research to the important choices humanity must make and teach our students to do the same. We also must lead by example and pursue sustainability on our campus.”

—John Etchemendy
Provost
Stanford University

Sustainability at Stanford

A Year in Review

2012-13

WELCOME

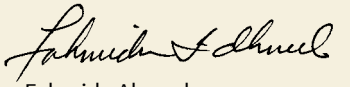
The Office of Sustainability and our campus partners are pleased to present the 2012-13 edition of *Sustainability at Stanford: A Year in Review*, which showcases the strides made in campus sustainability during the academic year. This annual publication takes a comprehensive view of Stanford as an institution that is investing in sustainability across all aspects of the university. The report summarizes operational, academic and programmatic achievements and presents metrics and trends in campus sustainability.

The first half of this multipurpose report presents featured topics and initiatives in operations and academia, demonstrating Stanford's commitment to sustainability in teaching and action. The second half presents a series of snapshot stories from throughout the year, complementing the featured topic articles and capturing the steady pulse of sustainability at Stanford.

Innovation and efficiency have driven Stanford's sustainability mission for decades, with an emphasis placed on a balanced and long-range view. As a result, the campus has continued to make consistent improvements despite growth, demonstrating its leadership in sustainability. By incorporating sustainability into regional planning for energy, water, transportation and buildings in the coming years, the campus is committed to lead by example while providing value to all constituents.

Over 40 departments and other entities from the entire campus community contributed content to our fifth annual report. Together, as a campus that achieved both Princeton Review Green Honor Roll status and *Sierra* magazine top 10 ranking for the fourth consecutive year, we celebrate Stanford's commitment to sustainability and look forward to the exciting journey ahead.

With best regards,



Fahmida Ahmed
Office of Sustainability
Stanford University

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FEATURED TOPICS

Introduction to Featured Topics

Annual Highlights

Sustainability is a core value at Stanford, deeply integrated into academics, campus operations, communications and events. Sustainability teachings and practices are enriching our students' academic experience, reducing the university's environmental impact, saving resources and engaging the campus community.

This section of the report highlights a number of featured sustainability topics, with each article summarizing key accomplishments, results and trends and academic integration, as well as offering some insight into the work ahead. Here are some of the most significant and unique accomplishments featured in *Sustainability at Stanford: A Year in Review 2012-13*:

- **Honor roll in overall sustainability:** The Princeton Review has named Stanford to its **2014 Green Honor Roll**, a list of 22 colleges and universities selected from a group of 832 by the education services company as the most environmentally progressive schools in the nation. Stanford received the highest score – 99 – in the annual rating. Stanford also ranked among *Sierra* magazine's top 10 Cool Schools green ranking for the fourth year in a row. In 2012-13, Stanford maintained a Gold rating, the highest level awarded to date, from the Association for the Advancement of Sustainability in Higher Education.
- **Interdisciplinary research:** Stanford continues to produce **leading interdisciplinary research** to develop solutions to the world's most pressing environmental problems. The Stanford Woods Institute for the Environment, the Precourt Institute for Energy (PIE) and others continue to award millions of dollars each year towards innovative research projects.
- **Greening of the energy supply:** Stanford has committed to transforming its energy system through Stanford Energy System Innovations (SESI), which will reduce greenhouse gas emissions by 50% and total campus potable water use by 18% upon completion in 2015. The $438 million program is in active implementation, with progress shown live via the SESI website. The project was awarded the 2013 **Effective & Innovative Practices Award** by APPA, the largest association of facilities departments of academic institutions.

- **Expanded and flexible sustainability curricula:** The 2010 Study of Undergraduate Education at Stanford resulted in, among other recommendations, a series of new breadth requirements for all students, set to launch in 2013-14. This new system shifts undergraduate requirements from **a discipline-based to a capacity-based model**, which will enable students to take sustainability-related courses that will count towards breadth requirements. Today, all seven schools offer a wide range of environmental and sustainability-related courses and research opportunities, with over 750 sustainability-related graduate and undergraduate courses offered across campus.
- **Reduced drive-alone rate:** In 2013, the employee drive-alone rate **dropped to 42%**, compared to 72% in 2002 at the inception of the enhanced Transportation Demand Management program. More than 3,800 Stanford commuters started using alternative transportation during this period. Commute-related emissions remain below 1990 levels. The Commute Club has more than doubled its membership since 2002.
- **High-performance buildings:** Stanford's Jerry Yang and Akiko Yamazaki Environment and Energy Building (Y2E2), the first large-scale high-performance building at Stanford, earned a LEED-EBOM (Existing Building: Operations & Maintenance) **Platinum certification**, the highest rating awarded by the U.S. Green Building Council.
- **Higher landfill diversion:** Stanford has increased its landfill diversion rate from 30% in 1994 to **66% in 2012** and reduced its landfilled tonnage to an all-time low.
- **Campus Event:** The **Celebrating Sustainability Festival**, a first-of-its-kind event focused on behavioral sustainability, was held in April. Over 35 departments/entities, 60 presenters and 20 volunteers hosted over 1,000 guests at the festival on Earth Day.
- **Collaborative governance:** The **Provost's Committee on Sustainability** finished its first year of collaboration and made progress in integrating sustainability into the departments of Athletics and Procurement and in developing a campus-wide Cardinal Green program.

Leadership in Sustainability

Central to the academic endeavor has been the Initiative on the Environment and Sustainability, which boosted interdisciplinary research and teaching in all seven of Stanford's schools, as well as in interdisciplinary institutes, centers and associated programs across campus, in recognition of the fact that solutions to complex challenges demand collaboration across multiple fields. The School of Earth Sciences, the School of Engineering, the Graduate School of Business, the Graduate School of Education, the School of Humanities and Sciences, the Law School and the School of Medicine are leaders in sustainability research and teaching. Leading institutes such as Woods (founded in 2006) and PIE (founded in 2009) serve as the academic integration points and coordination platforms for interdisciplinary research and programs.

The Department of Sustainability & Energy Management (SEM) within Land, Buildings & Real Estate (LBRE) leads initiatives on campus physical infrastructure and programs in energy and climate, water, transportation, building operations and information systems. The Office of Sustainability (founded in 2008 as an entity of SEM) connects campus departments and other entities and works collaboratively with them to steer sustainability-specific initiatives. The office works on long-range sustainability analysis and planning, evaluation and reporting, communication and outreach, academic integration, behavior-based programs and governance coordination.

Creating a bridge between operational groups and academic entities is the Provost's Committee on Sustainability and the Sustainability Working Group. With a commitment to uphold sustainability as a visible priority at Stanford, the committees work to encourage and promote collaborations among sustainability programs across schools, institutes and students. Additional critical sustainability partners at Stanford include all LBRE departments; Residential & Dining Enterprises, which houses its own sustainable food and student housing programs; Stanford Recycling Center, run by Peninsula Sanitary Service, Inc.; University Communications; Government and Community Relations; the Alumni Association; and over 20 student organizations.

Feature Stories Ahead

The feature stories in this report provide background and progress on sustainability initiatives across key operational, academic and programmatic topic areas. The operations section focuses on the year's milestones and performance achievements, while the section on academia focuses on key programs in schools and institutes, as well as research highlights from this academic year. The Office of Sustainability section showcases the broader programs that aim to enhance the campus experience of sustainability at Stanford. All feature stories also offer a "looking ahead" section sharing plans for progress in the coming year, as well as details on programs set to launch or improve.

All of the initiatives highlighted in our feature stories represent collaborative efforts across multiple entities and areas of expertise at Stanford. To demonstrate the fundamental interconnectedness of these campus initiatives, we highlight the two closest related sustainability topics at the start of each feature story. Check out the Topic Guide on page vi to view a list of these related topic areas and icons.

Sustainability in Campus Operations

Stanford incorporates sustainability practices and innovation into every aspect of campus life. The university has undertaken major ongoing initiatives to reduce energy and water use, apply stringent environmental standards to all new buildings, encourage sustainable living, promote low-impact transportation, conserve natural resources and decrease waste. Articles featured in this section describe the milestones and performance achievements of the past year across various operational departments and initiatives, with an emphasis on Stanford's effort to push ever forward as a leader in the practice of sustainable campus operation.

Stanford continues to maintain and analyze the effectiveness of its sustainability programs and identify opportunities for improvement. Throughout articles that follow, these programs and related results will be highlighted. To illustrate the collective impact of sustainability programs in campus operations, this section begins with a collection of graphics demonstrating trends in resource consumption over time.

Trends in Sustainability Performance

ASSESSMENT & EVALUATIONS

WATER CONSERVATION

WASTE MINIMIZATION

Background:

Proper assessment of Stanford's success in achieving a culture of sustainability depends heavily on tracking performance metrics and reporting them both internally and externally. This commitment to transparency and accountability helps the university strengthen its sustainability programs and services. The graphic below depicts trends in resource consumption in relation to this past year as well as the baseline program year.

Operational Sustainability Metrics Summary

	Annual Trend (2012 vs. 2011)	**Baseline Trend** (2012 vs. Base)	Baseline Year
Total Energy Use	↓ 0.7%	↑ 10.6%	2000
Total Energy Intensity	↑ 2.6%	↓ 6.1%	2000
Greenhouse Gas Emissions	↓ 3.2%	↑ 4.9%	2007*
Greenhouse Gas Intensity	↓ 3.3%	↓ 1.1%	2007*
Landfilled Waste	↓ 1.6%	↓ 31.6%	2000
Drive-Alone Rate	↓ 5.1%	↓ 30.1%	2002*
Domestic Water Use	↓ 0.3%	↓ 21.4%	2000
Domestic Water Intensity	↑ 2.4%	↓ 32.6%	2000

* Years other than 2000 denote formal program start dates and/or the earliest year for which robust data is available.

- Performance in relation to baseline year: Total energy use and total water use decreased due to the success of Stanford's high-performance buildings and retrofit programs.
- Performance in relation to last year: In the past year, minor increases in total energy intensity and domestic water intensity reflect replacement of low-intensity office space with high-intensity laboratory space in the building portfolio.

Individual Impact: A Look at Per Capita Consumption

In addition to tracking absolute consumption and intensity trends, Stanford also considers per capita resource use on an annual basis. As the university grows to support its academic mission, responsible growth is both a priority and a tool for informing long-range strategic planning. As the total campus population continues to grow, the suite of efficiency and conservation programs implemented by SEM and its partner organizations ensures that each individual footprint shrinks. While per capita consumption in 2012-13 was reduced by several percentage points compared the previous year, per capita consumption compared to the baseline year has decreased significantly.

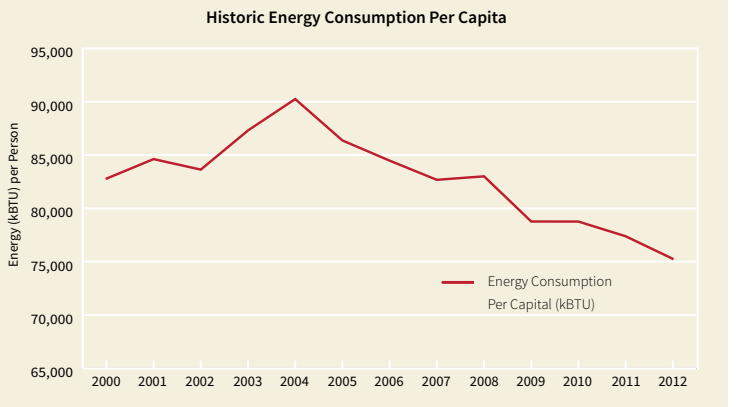
Per Capita* Consumption Trends

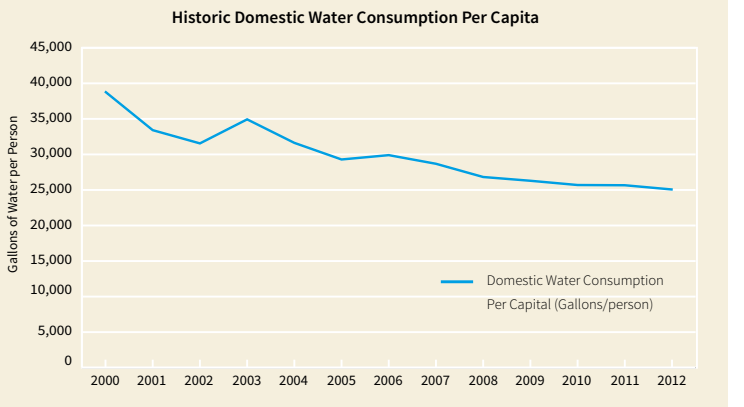
	Annual Trend (2012 vs. 2011)	Baseline Trend (2012 vs. Base)	Baseline Year
Total Energy Per Capita	↓ 3%	↓ 9%	2000
GHG Emissions Per Capita	↓ 5%	↓ 5%	2000
Domestic Water Per Capita	↓ 2%	↓ 35%	2007
Landfilled Waste Per Capita	↓ 4%	↓ 44%	2000

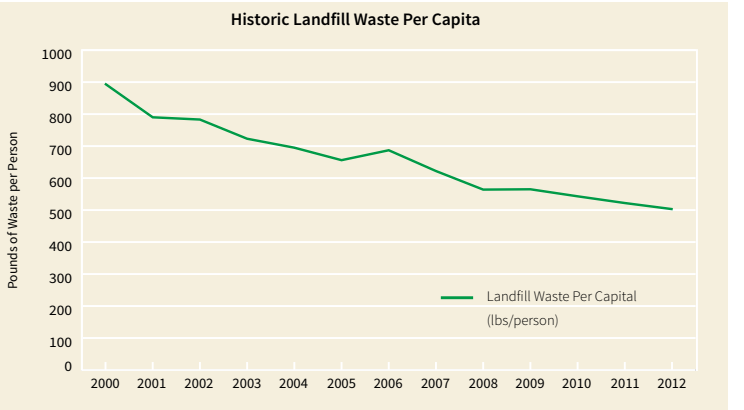
* Population numbers sourced from the annual Stanford Population Report compiled by the Office of Institutional Research and Decision Support and publicly available.

A detailed look at the magnitude of per capita changes in energy, water and landfilled waste illustrates effective resource management at Stanford. As demonstrated in the charts on the adjacent page, resource conservation has long been a university priority and has achieved continued success.

Mindful of the continued growth necessary to support and advance its academic mission and enroll more students, Stanford maintains an unrelenting commitment to reducing its impact on resources. This trend is consistent across comparisons from year-to-year, as compared to baseline, and in analyzing absolute values over the course of several years (see spread on page 12–13).







Stanford is dedicated to driving resource conservation at the individual and operational levels. In the articles following these summary graphics, operational departments and initiatives provide detail on the programs and services Stanford employs to improve efficiency, conserve resources and ultimately reduce Stanford's impact while enhancing learning opportunities across campus.

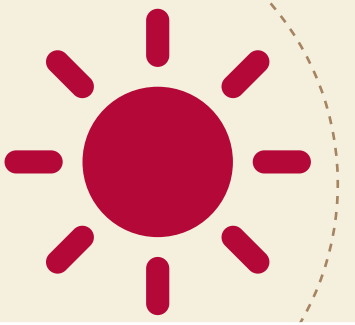
Stanford Operational Sustainability Metrics 2000–2012

Sustainability Area	Metrics	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Energy														
Electricity	kwh (in millions)	175.4	175.1	176.3	180.8	186.8	190.3	194.5	198.2	198.9	198.9	206.2	207.8	210.3
	kwh/usf [1,2,3]	17.5	17.1	16.8	17.3	17.5	17.7	18.0	18.0	18.2	17.7	17.9	17.2	17.9
Steam	lbs (in millions)	798.8	847.7	860.5	865.4	878.8	904.4	876.1	858.4	883.5	825.7	848.2	839.0	815.0
	lbs/usf	91.5	97.1	98.8	99.8	98.8	100.5	97.7	93.4	96.2	86.5	86.1	80.8	81.2
Chilled Water	ton-hr (in millions)	48.0	48.0	49.8	54.3	59.9	55.4	53.5	53.6	56.3	56.2	52.8	55.1	55.3
	ton-hr/usf	6.7	6.7	7.0	7.6	7.9	7.2	6.9	6.7	7.1	6.8	6.2	6.1	6.3
Greenhouse Gas Emissions														
Publicly Reported Emissions [4]	$MTCO_2$	n/a	n/a	n/a	n/a	n/a	n/a	168,400	182,900	180,700	182,400	195,800	198,300	191,900[5]
Emissions Intensity	lbs of CO_2/gsf [6]	n/a	n/a	n/a	n/a	n/a	n/a	25.54	26.65	26.49	27.49	28.08	27.25	26.34
Waste Minimization														
Total Diverted	tons	11,276	11,300	11,587	11,047	13,629	12,668	14,732	13,193	14,686	15,251	14,261	12,814	15,039
Total Landfilled	tons	11,495	10,194	10,429	9,533	9,262	9,094	9,558	8,820	8,180	8,384	8,104	7,995	7,867
Total Discards	tons	22,771	21,494	22,016	20,580	22,891	21,762	24,290	22,014	22,866	23,635	22,369	20,809	22,906
Diversion Rate		50%	53%	53%	54%	60%	58%	61%	60%	64%	65%	64%	62%	66%
Transportation														
Commuter Drive-Alone Rate (employees only)		n/a	n/a	72%	65%	63%	58%	54%	52%	51%	48%	48%	46%	47%
Commuter Drive-Alone Rate (all off-campus commuters)		n/a	n/a	n/a	60%	59%	54%	50%	46%	46%	42%	42%	39%	41%
Food Purchasing														
Sustainable Food Purchases [7]		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	41.9%	43.6%	41.6%
		00/01	**01/02**	**02/03**	**03/04**	**04/05**	**05/06**	**06/07**	**07/08**	**08/09**	**09/10**	**10/11**	**11/12**	**12/13**
Water														
Domestic	gals (in millions)	997.2	862.8	840.1	921.1	843.1	811.8	832.4	841.8	778.6	780.8	774.7	786.7	784.1
	gals/usf	96.8	82.1	78.0	85.7	76.6	73.5	75.1	74.7	69.6	67.8	65.5	63.7	65.2
Lake	gals (in millions)	431.4	406.6	362.7	364.2	332.1	270.5	347.2	446.8	378.8	375.2	391.3	430.7	445.4

Note:

1. In 2010 Stanford transitioned to usable square footage (USF) in lieu of gross square footage (GSF) since tracked campus GSF data now includes attic areas and other spaces not normally used or conditioned. USF represents utility service area more accurately and is used in this table starting in 2000.
2. In 2012 more accurate historic USF information became available and therefore the service areas have been updated starting in 2000 to better reflect the state of campus at that time.
3. Service areas for electricity, steam, chilled water, and domestic water are different, and USF served by electricity and domestic water exclude parking structures.
4. Emissions for 2006 - 2009 verified per the California Climate Action Registry General Reporting Protocol, including de minimus emissions. Emissions for 2010 & 2011 verified per the Climate Registry General Reporting Protocol, including simplified estimation (de minimus equivalent) emissions.
5. Emissions for 2012 per the Climate Registry General Reporting Protocol, including simplified estimation (de minimus equivalent) emissions, verification pending.
6. GSF included in the emissions intensity calculation corresponds to the properties included in the emissions inventory as defined by the operational control boundary method.
7. Calculations for sustainable food purchasing by R&DE Stanford Dining correspond to the criteria defined by the Association for the Advancement of Sustainability in Higher Education's Sustainability Tracking, Assessment, and Rating System. This includes food and beverages grown or processed within 250 miles of campus and/or third-party certified (USDA Certified Organic, Marine Stewardship Council Blue Ecolabel, Monterey Bay Aquarium Seafood Watch Approved, Fair Trade, Certified Humane Raised and Handled).

Stanford Energy System Innovations in Implementation



CLIMATE & ENERGY

WATER CONSERVATION

NEW BUILDINGS & RENOVATIONS

Background

In December 2011, Stanford's Board of Trustees approved the Stanford Energy System Innovations (SESI) program, designed to meet the university's future energy needs while reducing greenhouse gas (GHG) emissions and water consumption. Stanford has historically done much to reduce GHG impacts via energy efficiency, and in late 2007, the university set out to develop a formal action plan incorporating existing best practices, and in innovative new ways. The resulting Stanford Energy and Climate Plan is one of the most ambitious carbon reduction programs at any major U.S. university.

The key elements of the plan include high efficiency standards for new buildings; continued efficiency improvements for existing buildings; and a cutting-edge energy supply system known as the SESI project, which will reduce campus emissions by 50% from 1990 levels in 2015. Conceived in the Department of Sustainability & Energy Management (SEM) and being implemented in collaboration with the Department of Project Management (DPM), the university architect's office, Land Use and Environmental Planning, Zones Management and Buildings and Grounds Maintenance, the SESI program is an all-hands Land, Buildings & Real Estate engagement that will deliver great benefits for Stanford University in decades to come.

Results

Due to the large overlap between campus heating and cooling demands, a new central energy facility (CEF) will include an innovative heat recovery design

The Road to Carbon Reduction

In 2011, for the sixth consecutive year, Stanford completed and verified its inventory of Scope I and Scope II CO_2 emissions. The 2011 inventory was verified through the Climate Registry. Net emissions remained relatively flat. Occupancy of newly constructed buildings and emissions from leased spaces contributed to the 1% increase from 2010 emissions.

Stanford reported approximately 191,900 metric tons of CO_2 emissions for 2012 (verification pending), a slight decrease from 2011 levels. Newly available and more precise utility-specific emission factors from non-CEF electricity purchases contributed to the decrease.

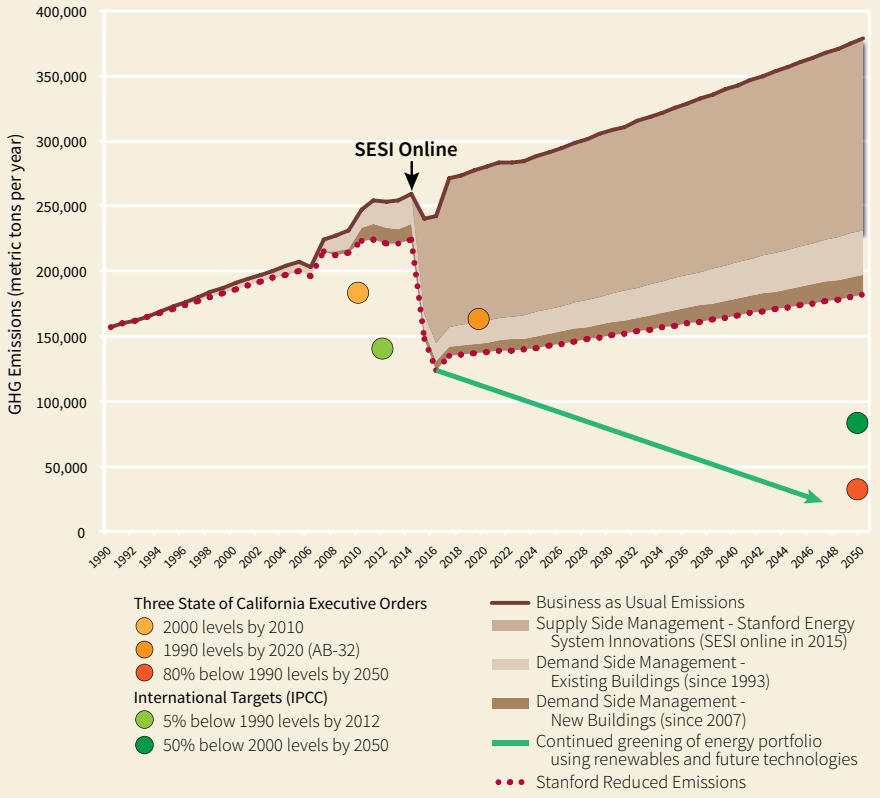
The university's emissions intensity remains lower than it was in 2007, which confirms the efficiency of Stanford's new high-performance buildings and the impact of its numerous retrofit programs. Emissions will significantly decrease in coming years as a result of the SESI program, dropping 50% below 1990 levels upon completion of construction in 2015.

that is significantly more efficient than the existing cogeneration process. Heat collected from buildings via the chilled-water loop will be captured for reuse, minimizing the use of conventional chillers to discharge waste heat via cooling towers. Heat recovery chillers will move the heat collected from the chilled-water loop to a new hot-water loop that will replace Stanford's aging steam distribution system. The $438 million project represents a significant transformation of the university energy supply from fossil-fuel-based cogeneration to a more efficient electric heat recovery system. Key benefits and results of the SESI program are as follows:

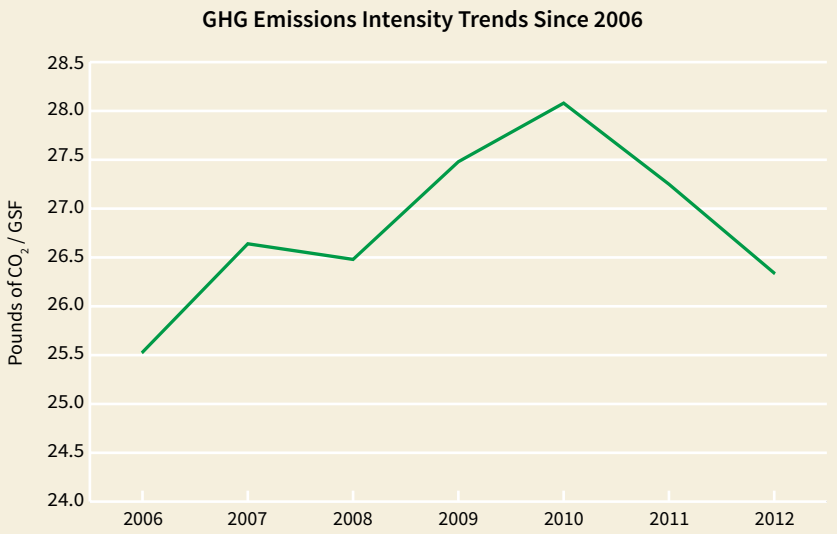
- As the new CEF comes online in 2015, the campus will **reduce its carbon emissions** at least 50% from 1990 levels. Simultaneously, an electricity-dependent energy supply system will offer higher reliability, lower cost and greater flexibility for green power procurement. Having achieved direct access to the California electricity market in early 2011, Stanford is now developing opportunities for a more economic and environmentally sound power portfolio.
- Due to the significant opportunity for heat recovery and the lower line losses of hot water compared to steam piping, the new energy system will be **70% more efficient** than the combined heat and power process of the current cogeneration facility.

- Since the majority of the waste heat from the chilled-water loop will be reused rather than discharged via evaporative cooling towers, total campus **potable water use will be reduced** by 18%.
- The SESI program provides the best-cost option compared to continuation of the current cogeneration system, with a net additional $100 million capital investment projected to yield **$300 million in savings** over the next 40 years.
- The implementation of the SESI program involves **significant work throughout the campus** between 2012 and 2015. DPM is managing design and construction for 20 miles of hot-water pipe installation, conversion of 155 buildings to receive hot water instead of steam, and construction of the new CEF and a new high-voltage substation. The SESI website launched in the summer of 2012 to provide an avenue for interested community members to learn about the program. It includes project fact sheets, links to related articles, an interactive campus map and real-time view of associated construction.

Energy & Climate Plan: Emissions Reduction Wedges & Targets



- Of the 20 miles of hot-water pipe to be installed, half have already been completed. Equipment in the mechanical rooms of 155 buildings is being modified to allow the use of hot water instead of steam for heating. This work is being carefully sequenced in multiple phases to minimize disruption to campus life. As each phase of piping and building conversion is completed, that section of campus will be moved off steam to hot water via a regional heat exchanger that will convert steam from the existing cogeneration plant to hot water. Once all phases of the conversion are complete, a full transition from the cogeneration plant to the new CEF will be made, the regional heat exchange stations will be removed and the cogeneration plant will be decommissioned and removed to make way for new academic buildings within the campus core.
- In 2012, design of the new CEF was completed, equipment manufacturers were selected, a general contracting firm was hired and **construction began in October**. Thus far, the plant foundations and underground utilities have been constructed, thermal energy storage tank installation is one-third complete and structural steel for the plant building is going up rapidly. Construction of the plant is projected to be complete by April 2015. The new CEF will be a state-of-the-art heat recovery plant featuring both hot- and cold-water thermal storage that relies primarily on a diversified mix of electricity sources for power.



Architect's rendering of the new central energy facility, a component of the SESI program. Once completed, SESI will cut Stanford's greenhouse gas emissions in half.

DPM is managing design and construction for 20 miles of underground hot-water pipe installation for SESI – half of which has already been completed.

SEM will operate it with a new automated control system invented at Stanford (patent pending) and currently under commercial development by a startup company (ROOT3 Technologies). This will assure optimal operation through predictive economic dispatching based on load and market electricity pricing forecasts and also allow for automated operation and optimal efficiency.

Academic Integration

The Energy and Climate Plan, which was first released in 2008 and evolved into SESI, has been a high-priority study and has incorporated various industry and faculty peer reviews from inception through approval. The first faculty GHG task force convened in 2009 to review the initial plan. Throughout 2011, the heat recovery scheme and proposed financial models were extensively peer reviewed by faculty from the School of Engineering and the Graduate School of Business, as well as a Board of Trustees advisory committee, along with industry consultants. SESI program studies have also periodically engaged graduate student researchers to verify models and assist with other assessments. SEM partnered with the Stanford Solar and Wind Energy Project, a student group, to carry out studies on the campus solar potential. Solar photovoltaic (PV) integration is one aspect of SESI currently under investigation, and the students assisted in analyzing data while gaining practical hands-on experience. Stanford staff will continue to partner with faculty and students as SESI proceeds.

Looking Ahead

As core elements of the SESI program are implemented, Phase 2 studies of additional potential major enhancements to the campus energy system have begun. These include:

- On-campus PV power installations;
- Development of a ground source heat exchange system to complement the core heat recovery process;
- Installation of a new high-voltage transmission line to improve the reliability of the grid serving the university;
- Installation of a plug-in electric vehicle infrastructure to support both private and university electric vehicles and electrification of the Stanford bus, truck and car fleet; and
- Installation of a natural gas–based centralized emergency generation and distributed electrical storage system to replace the current distributed diesel fuel emergency generation system.

Detailed feasibility studies of these potential enhancements are under way and will be completed in coming months.

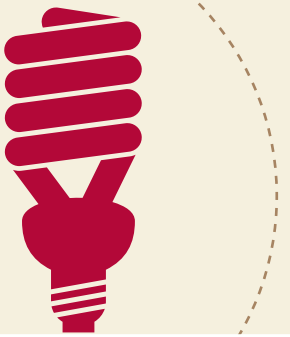
Related Snapshot Stories:

- SESI Progress Earns Local Recognition
- Stanford Breaks Ground on New Central Energy Facility
- SESI Wins APPA Award, Industry Recognition for Innovative Design

More Information:

http://sesi.stanford.edu

http://stanford.io/14NLQYw



Advancements in Energy Efficiency

ENERGY EFFICIENCY

NEW BUILDINGS & RENOVATIONS

CLIMATE & ENERGY

Background

Since 2010, a redesigned Facilities Energy Management (FEM) team in the Department of Sustainability & Energy Management has been responsible for coordinating the university's efforts to reduce energy use in existing buildings and to incorporate energy efficiency best practices into all new buildings. The team works with Operations and Zone Management to ensure buildings are operated efficiently and manages multiple programs that offer technical as well as financial assistance to facility managers, department leads and building occupants to encourage implementation of energy efficiency projects.

Results

As of 2012, Stanford has reduced energy intensity on campus 6% from a 2000 baseline, despite continued campus growth. Energy efficiency programs have been strongly present on campus since the '80s. Metering campus buildings has paid dividends throughout the last decade in developing more advanced programs to improve energy efficiency. Specific results this year include the following:

- In 2013, two additional buildings – the Clark Center and Green Earth Sciences – completed detailed energy studies and were approved for **Whole Building Retrofit Program** projects valued at $2.6 million. The Whole Building Energy Retrofit Program seeks to reduce energy consumption in Stanford's most energy-intensive buildings. This $30 million capital program began in 2004 to address the 12 largest energy-consuming campus buildings

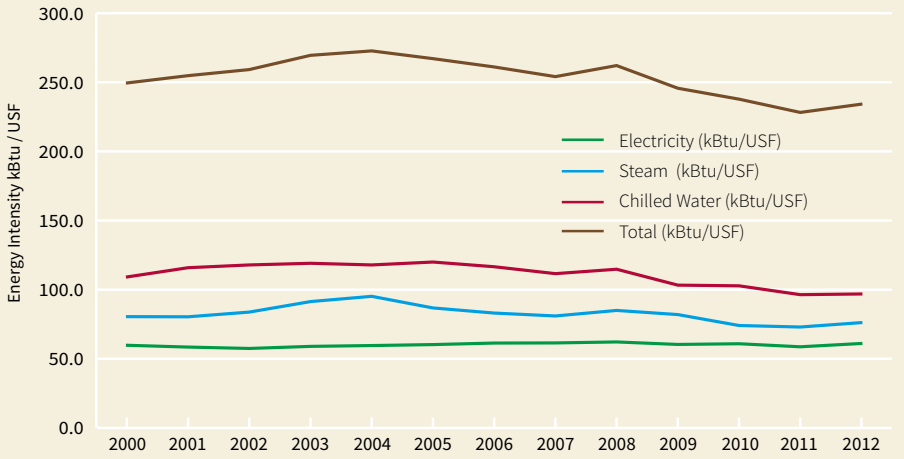
and now includes the top 26, which represent 60% of total campus energy use. Retrofits have been completed in 13 buildings thus far and have saved more than $3.6 million a year in energy costs. The program has also yielded over $2 million in financial incentives via Pacific Gas & Electric rebates.

» Since 1993, the **Energy Retrofit Program** has provided rebates to Stanford Utility users who install efficiency upgrades within their facilities. Rebates cover some or all of the costs of the upgrade projects, depending on the project payback period. Notable projects completed in 2012-13 included lighting upgrades at the School of Medicine's Beckman Center and Center for Clinical Sciences Research, new variable speed drives for HVAC fans in multiple Athletics buildings and LED cab lighting upgrades in several elevators across campus.

» Operations staff continue to monitor **building performance**, looking for improvement opportunities related to operating schedules, HVAC set points and maintenance work. Program highlights for 2013 included the completion of 20 building HVAC recommissioning projects covering over 1.2 million square feet. In addition, the staff continued to refine the Building Systems Performance Evaluation, which is used to probe, inspect and monitor various sensors in HVAC systems. This allows operations technicians to remotely control, adjust and repair room settings to meet user needs and optimize performance.

» The FEM team received **project rebates** totalling nearly $400K this year. Rebates from PG&E totaled $49,625 for 2012-13 projects, including Parking Structure 1, Psychiatry Academic and Clinic Building, Bing Concert Hall and Forsythe Data Center. Project rebates from the City of Palo Alto Utility totaled $352,178 for 2012-13 projects, including 3165 Porter Drive and 3155 Porter Drive.

Energy Intensity Trends Since 2000



» The FEM team assisted in the evaluation and certification process for the Jerry Yang and Akiko Yamazaki Environment and Energy Building (Y2E2), which earned **LEED for Existing Buildings: Operations & Maintenance (EBOM) Platinum certification**, the highest rating awarded by the U.S. Green Building Council.

» The 2012-13 **Winter Energy Curtailment** effort allowed Stanford to avoid $254,000 in utility charges. The cumulative net energy cost savings since 2001 total $2.7 million.

Due to the cumulative effect of these energy efficiency programs, overall energy intensity (measured in thousand British thermal units per usable square foot, kBtu/USF) remains less than it was in 2000, despite the addition of nearly 1 million square feet of new energy-intensive laboratory space. This suggests that the suite of energy-saving programs targeting large-scale building retrofits, small-scale retrofits and HVAC controls, coupled with new construction standards, has curbed the rate of increase in energy intensity.

Other notable performance trends, as illustrated in the chart to the left, include the following:

» Electricity consumption per USF has remained relatively constant even as energy-intensive research functions and computing needs have increased.

» Steam consumption per USF has also remained relatively flat. A notable decrease starting in 2009 correlates with the completion of major HVAC upgrade projects in multiple buildings.

» Chilled-water consumption per USF increased through 2004 but is now trending downward. This also illustrates the benefits of energy retrofits in multiple large buildings.

Academic Integration

The FEM team engages frequently with research faculty to better understand energy demand inherent to their work and tailors program offerings accordingly:

» Stanford's Energy Conservation Incentive Program, established in 2004, provides schools and administrative units a financial incentive to use less electricity. The program sets budgets based on past consumption and lets participants "cash in" unused kilowatt-hours; those that exceed their electricity budgets pay the difference out of their own funds. FEM completed a large analysis in 2013 to recalibrate the budgets of the schools and units to more closely match them with expected performance.

Advanced metering equipment enables precise building energy management.

Stanford Utilities staff use new building management systems to quickly identify performance problems and solutions.

The analysis highlighted that on average, most units are coming in well under budget. Given this discovery, consumption budgets will be adjusted for future planning.

» FEM staff regularly interact with faculty in the Center for Integrated Facility Engineering (CIFE). FEM team members serve as guest speakers for CIFE courses, help review student projects and provide feedback on research needs regarding the operation of high-performance buildings.

» FEM provided a lecture and facility tour in support of last summer's Energizing a Sustainable Future Sophomore College course (CEE 13SC). The team's contribution focused on practical experiences associated with designing and operating sustainable buildings on campus. FEM staff also participated in an ideation meeting with the Energy & Environment Affiliates Program, providing input on the types of sensors deployed in buildings, the quality and resolution of the resultant data, how the data are currently managed and utilized and future opportunities for improvement in sensor performance, data storage and "smart" applications for processing the data.

Looking Ahead

Construction starts early this coming year on several **Whole Building Energy Retrofit Program** projects, including the Paul Allen Building, the Arrillaga Alumni Center and Green Earth Sciences. When completed, these projects will save a total of over $200,000 per year in energy costs.

The FEM team is working closely with the campus planning office to conduct a life cycle cost analysis of various new high-efficiency outdoor lighting technologies. Other key considerations are light quality, aesthetics and reliability. The

combined effort will culminate in a deployment of retrofit solutions to reduce energy consumption by about half in important lighting applications such as parking lots, walking paths and intersections.

In the coming year additional research will be conducted on means to further improve **air flow management** in large laboratory buildings. These facilities are typically the largest energy consumers on campus due to the large air change rates required for occupant safety, which represent a large HVAC load. The university has been a leader in energy efficiency retrofits for such buildings and will seek to maintain its role as a pioneer for new technologies and practices.

Finally, the building controls group will be developing a **controls roadmap** to outline further steps to monitor and automate operations in Stanford's facilities. A key aspect of this project is to define what it means to have "smart" buildings and what functionality the building systems need to include.

Related Snapshot Stories:

» Case Study on Success of Energy Retrofit Programs Featured

» Winter Closure Campaign Saves Energy

» Sustainable IT program Named Finalist in Green Enterprise IT Awards

More Information:

http://lbre.stanford.edu/sem/energy_conservation

http://sustainable.stanford.edu/buildings

Strides in Water Efficiency and Conservation

WATER CONSERVATION

NEW BUILDINGS & RENOVATIONS

CLIMATE & ENERGY

Background

Stanford practices sustainable water use by managing available resources to meet its needs while preserving ecological systems and this vital resource for future generations. Stanford has improved campus surface water supplies, developed innovative alternative water supplies and continued water conservation efforts for its buildings and grounds.

Results

As of 2012, Stanford has reduced domestic water use on campus 21% from a 2000 baseline, despite adding more than 1 million gross square feet to the academic buildings portfolio and over 1,400 units of faculty, staff and student housing. The 2003 Water Conservation Master Plan identified 14 water conservation measures for campus implementation; today, more than 20 such measures are employed. Specific activities this year include the following:

» Staff from the School of Medicine and the Department of Sustainability & Energy Management collaborated to complete **a retrofit of large washing equipment at the School of Medicine**. The changes included three large washers and reverse-osmosis water reuse for quenching hot wastewater from washing equipment. The new equipment was installed in November 2012. After just six months, there was a 43% reduction in average daily water use compared to the previous two years (December 2010–November 2012). Based on data from the first six months, an estimated 2.2 million gallons of water and $35,000 in domestic and wastewater charge-out costs will be saved per year.

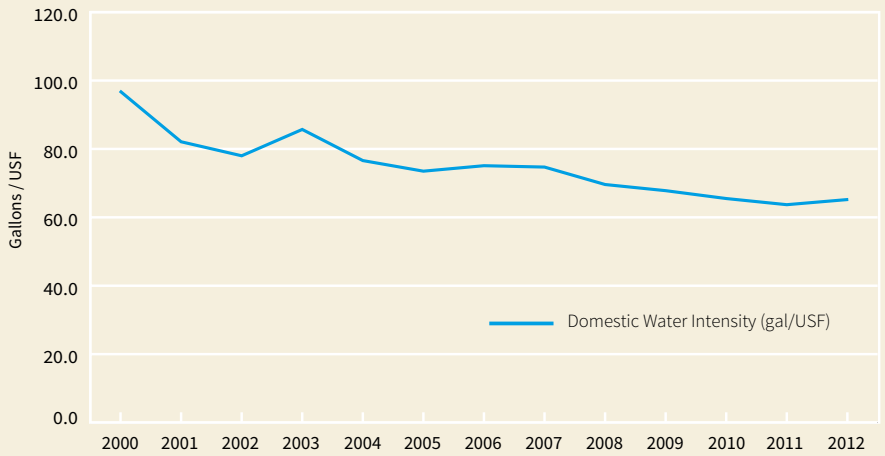
New real-time monitoring technology has helped stem water leaks, resulting in a 38% decrease in irrigation leaks.

The overhauled Waterwise Garden on Raimundo Way now features new low-water-use plants and other water-saving landscaping measures.

- Water efficiency (WE) staff completed a two-year study to develop **best management practices and metrics for landscape sites** on campus. WE staff collaborated with the grounds department, landscape contractors and independent consultants on this initiative. Technology used included real-time water monitoring devices, water budget software and weather-based irrigation controllers.
- **Conservation measures** implemented at the Bing Nursery School include changes to the rotor spray nozzles to reduce the spray pattern radius and precipitation rate, additional irrigation valves to separate hydrozones to better align with plant watering requirements and a return to irrigation controlled by a weather-based system. After these changes were implemented in April 2012, annual water use dropped 9% compared to the previous year (May 2011 to April 2012). This reduction occurred despite the relatively dry weather, with no substantial rain since December 2012.
- Six **weather-based irrigation controllers** were installed at landscaped areas surrounding the Li Ka Shing Center for Learning and Knowledge (LKSC), Lorry I. Lokey Stem Cell Research Building (SIM1) and Center for Clinical Sciences Research (CCSR). LKSC, SIM1 and CCSR reduced their combined outdoor water consumption by almost 2 million gallons during the first part of the pilot study (May 2012 to April 2013) compared to the previous year (May 2011 to April 2012). Based on the results, the School of Medicine is planning to install additional weather-based controllers at other sites. Two more such controllers – one using new wireless valve technology – were installed in residential parks this summer.
- In 2011, the WE program started testing **real-time monitoring technology** to identify water use on a more granular basis, recognize leaks (24 hours of continuous use) and monitor landscaping and campus buildings. This technology has provided time-of-water-use information directly to customers involved in the study, which has resulted in greater attention to water consumption and increased water efficiency. Since the development of leak alerts in September 2012, over 50% of leaks metered at landscape sites have lasted less than two days and irrigation leaks have been reduced by 5,000 gallons per month, a 38% decrease.

- A new environmental quality and **water efficiency website** was launched in February to make information and resources more easily accessible for the Stanford campus community. The website has proved to be a successful outreach tool.
- The water conservation program has maintained and updated an **interactive map**, featured on the water efficiency website, that details water conservation retrofit projects from 2002 to the present. A variety of sorting parameters allow users to quickly search more than 300 indoor and outdoor projects. Clicking on the map's icons provides details on the water-efficient equipment installed during retrofit projects, estimated water savings and general water profiles for buildings opened since 2007.
- In May 2013, Stanford's grounds department completed an **overhaul of the Waterwise Garden** that included planting new low-water-use plants, extending the irrigation system and laying new mulch throughout the garden. The Waterwise Garden is located on Raimundo Way near Stanford Avenue.

Domestic Water Intensity Trends Since 2000



» Stanford staff coordinated with local plumbing-product representatives to test new and **innovative water-efficient fixtures** as part of an ongoing demonstration program. Since 2010, the program has field-tested over 20 different models of low-flow fixtures, including toilets, urinals, showerheads and faucets.

The chart on the previous page shows the cumulative effect of these projects. Stanford has reduced domestic water intensity by 33% since 2000.

Looking Ahead

In 2014, the water services group will continue investigating Stanford's water resources to inform the development of a sustainable water management plan for the university. Investigations are being conducted on Stanford's surface water supplies (reservoirs and creeks), groundwater and storm water capture opportunities. A wide-ranging study of options for the future of Searsville Dam and Reservoir is well under way and, along with a concurrent public input process, is expected to be completed within the next year. Based on this information, campus leadership is expected to make decisions about the long-term future of the facility, which will then allow completion of a campus-wide Sustainable Water Master Plan.

The WE team will continue with a second phase of the real-time water monitoring pilot study that began in 2011. This phase will focus on improving leak alert notifications and communication with landscape and facility managers. Staff will develop a new pilot outdoor water survey program that addresses the top 10% of residential landscape water users. The purpose of the survey is to identify leaks, reduce irrigation runoff and improve overall efficiency while maintaining healthy plants. Staff will continue to partner with students, faculty, staff and residents to implement projects that promote water conservation.

Related Snapshot Stories:

» Stanford Launches New Environmental Quality and Water Efficiency Website

» The Jury is In – Tap is Tasty

More Information:

http://lbre.stanford.edu/sem/Water_Efficiency

http://sustainable.stanford.edu/water_initiatives

Distinction in Building Design, Construction & Renovations

NEW BUILDINGS & RENOVATIONS

WATER CONSERVATION

CLIMATE & ENERGY

Background

To evolve as a center of learning, pursue world-changing research and respond to pressing environmental concerns, Stanford designs and creates buildings that use resources wisely and provide healthy, productive learning environments. Buildings represent one of the university's greatest sustainability opportunities and challenges. Energy generation for building heating, cooling and electricity accounts for the majority of Stanford's carbon emissions – and from 2000 to 2025, the university expects to build 2 million square feet of academic facilities, as well as housing for 2,400 students, faculty and staff.

The Department of Project Management (DPM) oversees major construction on campus. Advancements in high-performance building design, construction and renovation continue to ensure that Stanford delivers and maintains new facilities in accordance with its project delivery process manual. In 2008, Stanford updated the manual to include aggressive energy and water reduction goals. The DPM now incorporates sustainability through guidelines for life cycle cost analysis, sustainable buildings and salvage and recycling programs, as well as a strong emphasis on commissioning.

Results

New construction and major renovation projects on campus typically use 30% less energy than building codes allow and consume 25% less potable water than comparable campus buildings. All new buildings must comply with the Santa Clara County Green Building ordinance, which requires projects to reduce energy

consumption 10% below the amount allowed by California Title 24 and water use 20% below the California Building Code standard. In addition, Stanford continues to explore methods to increase space efficiency to reduce the need for new construction. Designing buildings to be more efficient reduces the demands on the main campus heating, cooling and electrical systems, creating a ripple effect of cost savings and environmental benefits.

The specific examples below highlight achievements from 2012-13 that help the Stanford campus progress towards this goal.

- The Jerry Yang and Akiko Yamazaki Environment and Energy Building (Y2E2) was designed to conserve natural resources and offer an extraordinary learning environment. Y2E2's innovative design delivers substantial efficiency gains over similar standard buildings, and it continues to serve as a learning tool for both building occupants and the campus community. In summer 2013, Y2E2 earned **LEED for Existing Buildings: Operations & Maintenance (EBOM) Platinum certification**, the highest rating awarded by the U.S. Green Building Council. As the first LEED-EBOM certification on campus, Y2E2 allowed Stanford to evaluate the benefits of the certification process and further investigate opportunities in design and operation of high-performance buildings.
- The Anderson Art Collection building is under construction, with completion scheduled for December 2013. This 30,000-square-foot gallery will house a permanent collection of 121 works by 86 artists. In addition to an innovative heating, ventilation and air conditioning system, the Anderson building also uses **a state-of-the-art LED lighting system** that meets the curators' demands for high-quality display lighting, yet uses significantly less energy and produces much less heat than standard art display lighting. The energy reduction target for this building is 32%.
- The fourth and final building in the Science and Engineering Quad (SEQ), BioEngineering and Chemical Engineering, has been under construction and will be complete in December of this year. This building employs the same high-performance features that define the other SEQ buildings, including a high-performance building envelope and a **large (125kW) photovoltaic (PV) system**. Key features include variable volume fume hoods, zone-level heating and cooling and heat recovery (systems similar to those in the Lokey Stem Cell Research Building, completed in 2010 and performing 43% better than required by the energy code). Since research laboratories typically represent the largest energy use on campus, the benefits of these high-efficiency building components are magnified.
- To determine if the **LEED Platinum Knight Management Center** is meeting the ambitious energy and water design goals, a team from the GSB, the Department of Sustainability & Energy Management and Arup Consulting sifted through over a year's worth of data from the elaborate submetering and building energy management systems. After rerunning the energy models with the actual consumption data from the lighting, plug loads, and heating, cooling and ventilation systems, the team determined that the buildings were using 33.2% less energy than the code baseline, as anticipated. Furthermore, the PV system is producing over 12% (557,000 kWh/year) of the electricity needs, slightly exceeding the design predictions. On the water side, a combination of rainwater tanks and efficient water fixtures resulted in combined indoor and outdoor water savings of 78%.
- The 21,330-square-foot Stanford Research Computing Facility at SLAC was completed in the summer of 2013. The dean of research, in conjunction with IT Services, has proposed a new modular, scalable, **energy-efficient and high-density** scientific research computing facility that will support the university's and SLAC's growing research computing requirements.
- Construction continued on several components of the Stanford University Medical Center Renewal Project, including the Welch Road Utility Project, renovation of the Hoover Pavilion and site work for the Lucile Packard Children's Hospital (LPCH) expansion. Both the LPCH expansion and the new Stanford Hospital are expected to achieve **LEED New Construction Silver** equivalency.
- Finding **new uses for older buildings** is now a common practice at Stanford. What was once the home of the GSB will now contain the East Asian collection, Academic Computing Services and other programs currently housed in Meyer Library.

The final addition to the Engineering Quad, the BioEngineering and Chemical Engineering building, will be complete in December 2013.

The Y2E2 building has earned LEED for Existing Buildings: Operations & Maintenance Platinum certification.

The Knight Management Center, home to the Graduate School of Business, is designated LEED Platinum for New Construction.

Architect's rendering of the Anderson Collection (scheduled for completion in Dec. 2013), which will feature a state-of-the-art LED lighting system.

Academic Integration

Collaboration with faculty and research staff, particularly in the programming of interdisciplinary space, remains a DPM hallmark. The school/department user group is the program advocate throughout each project. This group may include the dean/director, faculty, staff and/or students. It designates a representative who is responsible for gathering and disseminating information, communicating it from the project team to the group and vice versa, within project schedule constraints. The DPM project manager coordinates directly with this representative. DPM relies on this collaboration to express the needs of the program to the university administration and to manage communication and decision making within the school/department.

One great example from 2012-13 is the Start.House. The two-bedroom, one-bath house is Stanford's entrant in the Solar Decathlon, a biennial competition run by the U.S. Department of Energy that challenges students to design and build innovative solar houses that will help usher green technology into modern home construction. Students worked with faculty and campus staff to design and construct of this house, which demonstrates leadership and innovation in sustainability.

Looking Ahead

To support excellence in building design, post-occupancy energy studies of high-performance buildings will continue. These studies create two significant benefits: trend information to determine building use and better understanding of building systems. Stanford uses this information to further optimize building operation and help inform future design decisions to optimize conservation of resources in future buildings.

The "Old Chemistry Building," built in 1903 but not occupied since the 1989 earthquake, will be transformed into the Science Teaching and Learning Center and will promote sustainability through reuse of materials. The building will include teaching laboratories for chemistry and biology and a new library facility. With a prime location facing Palm Drive, this building will create a new formal entrance to the Biology/Chemistry District. While the design team is still working to determine the specific water and energy targets, the building is expected to combine the best of historic Stanford architecture with innovative energy features found in the rest of the recently completed laboratories on campus.

Also being built is the highly anticipated Windhover Contemplation Center. The one-story, 4,000-square-foot center is tentatively scheduled to be completed in spring 2014. The new center will include three rooms featuring four large paintings by late Stanford art Professor Nathan Oliveira. Outside landscaping will feature a reflection pool and garden areas for meditation. The building will be enclosed in glass, allowing for viewing of the Oliveira paintings even from outside.

Additional high-performance renovation and construction projects under consideration for the 2013-14 academic year include Comstock Graduate Housing, Crown Quad Renovation, C. J. Huang (780 Welch), the Manzanita and Lagunita undergraduate dorms and McMurtry Art and Art History.

Stanford Energy System Innovations construction, including construction of the new, state-of-the-art central energy facility, will continue through 2015. Continued renovation of Panama Mall, to be completed in 2013, will fully convert a former back alley into an open boulevard and inviting academic space.

Together, these construction projects will ensure that Stanford has the most environmentally responsible and innovative facilities possible, allowing the university to fulfill its academic mission.

Related Snapshot Stories:

» Over 1,000 Trees Relocated with Transplant Program

» Y2E2 Receives LEED Platinum Certification

More Information:

http://sesi.stanford.edu

http://lbre.stanford.edu/dpm/our_projects

http://sustainable.stanford.edu/green_buildings

http://stanford.io/164H2Lq

Expanded Offerings in Transportation

TRANSPORTATION

BEHAVIOR-BASED PROGRAMS

COMMUNICATIONS & OUTREACH

Background

An essential part of Stanford's sustainability effort, the Transportation Demand Management (TDM) program to reduce university-related traffic impacts is one of the most comprehensive in the country. In 2012, TDM hosted a 10-year celebration of the Stanford Commute Club, which rewards commuters for primarily using sustainable transportation. Hundreds of Commute Club members attended and were featured in subsequent TDM marketing outreach. The Commute Club has grown from 3,600 members to over 8,300, with each member currently receiving up to $300 a year from Stanford for commuting by alternative transportation.

Stanford is also transitioning to more sustainable campus shuttles and fleet vehicles, expanding electric vehicle (EV) charging stations and increasing shuttle route efficiency. Annual ridership of the university's free Marguerite shuttle has risen to 1.9 million. By replacing other buses with fuel-efficient Sprinter vans on selected routes, the university has reduced emissions by 132 metric tons and fuel consumption by 13,000 gallons.

In addition, Stanford has continued to expand other transportation programs, including car sharing, which has grown from three Zipcars in 2007 to more than 60 cars at 23 locations today, making it the largest university Zipcar program in the nation.

Designated the nation's first and thus far only Platinum-Level Bicycle-Friendly University (2011-15), Stanford has expanded its bicycle program to accommodate the estimated 13,000 bikes on campus each day. The expansion has included the addition of bicycle safety repair stands, which now total six, and an increase in

bicycle parking capacity. Stanford now has 365 secure bike parking spaces (256 bike lockers and 109 bike cage spaces). In addition, bike racks provide more than 18,000 bike parking spaces on campus.

These TDM advances, coupled with extensive marketing outreach and promotions, enabled Stanford to reduce its drive-alone rate from 72% in 2002 to 47% in 2012, with more than half of university employee commuters now primarily using sustainable transportation. Demand for parking at Stanford has dropped more than 6% since 2002, despite campus growth.

Results

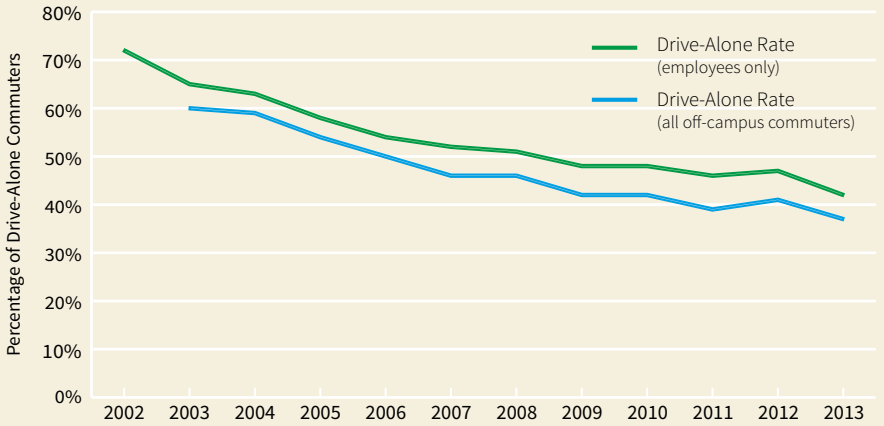
In academic year 2012-13, the university continued to expand its sustainable transportation efforts, including the introduction of electric buses to its fleet in a pilot project that will assess their performance on Stanford routes with the highest ridership.

The university developed a long-term Transportation Sustainability Plan, which will be regularly updated and expands on the successful TDM program. The plan positions Stanford not only to continue to satisfy the 2000 General Use Permit's trip-limit goals, but also to reduce transportation-related emissions, satisfy impending state and national regulations and be poised for transportation-related carbon reduction programs.

The 2012-13 performance achievements are listed below:

» In 2013, the employee drive-alone rate dropped to 42%, compared to 72% in 2002 at the inception of the enhanced TDM program. More than 3,800 Stanford commuters started using alternative transportation during this period. Commute-related emissions remain below 1990 levels. The Commute Club has more than doubled its membership since 2002.

Drive-Alone Rate Trends Since 2002



As the nation's first and only Platinum-Level Bicycle-Friendly University, Stanford has expanded its bicycle program to accommodate an estimated 13,000 bikes on campus each day.

Annual ridership of the free Marguerite shuttle has risen to 1.9 million.

» Marguerite shuttle passenger numbers rose from 1.7 million in 2011 to 1.9 million in 2012. Stanford added free Wi-Fi to three main commuter routes. The university continued to conserve fuel and reduce emissions and operating costs by adding three electric buses. This pilot project will assess whether electric buses should be incorporated in the university's fleet of 57 vehicles, which includes five diesel-electric hybrid transit buses.

» Bike to Work Day saw an increase of 500 Stanford riders over the previous year. Among the more than 1,870 Stanford riders, 715 commuters reported their mileage, logging a total of 3,820 miles and averaging 5.3 miles per trip. By biking instead of driving, these commuters eliminated an estimated 3,460 pounds of CO_2 emissions on Bike to Work Day.

» In 2012-13, the Commute Club marketed a special offer of one month of free transit parking for targeted drive-alone commuters to encourage them to try the train or express bus. A "Tell Us Your Story" promotion and new "Tell a Friend" online system rewarded Commute Club members for sharing their stories and encouraging friends to choose biking, walking, carpooling, vanpooling or riding transit.

» Larger buses were added to the East Bay Ardenwood Express route to serve growing ridership.

» Over one-third of Stanford's 1,300 fleet vehicles are electric, and the number of hybrid vehicles increases each year. The fleet also includes one experimental solar vehicle. The Marguerite shuttle fleet includes five diesel-electric hybrid buses and 52 buses fueled by biodiesel.

With more than 60 Zipcars at 23 locations, Stanford has the largest university Zipcar program in the country.

In August 2013, three electric buses were added to the Marguerite fleet as a trial project

Academic Integration

To reduce traffic congestion and vehicle emissions, Stanford launched Capri (Congestion and Parking Relief Incentives) in April 2012. The innovative research pilot project uses radio-frequency identification technology to track when participating commuters enter and exit campus and reward off-peak commutes. In 2013, Capri introduced the My Beats app to reward bike and walk commuters.

With My Beats and the original Capri program, participants receive credits for bike or walk commuting or driving during off-peak times. They can redeem the credits in a game that offers multiple opportunities to win cash prizes. The research team's goal is to change commuter behavior. In the process, they hope to determine optimum incentives, how to incorporate a game to engage and motivate commuters and how to leverage social networks to increase participation.

Looking Ahead

Many new and exciting TDM initiatives are in development, including plans for long-term growth and the expected launch of the second phase of the Capri program in 2013-14. In an effort to reduce wasted time, resources and emissions from cars circling full parking lots in search of spaces, this phase will reward drivers who park in lots with lower space utilization.

The existing EV charging policy is undergoing a review that includes assessing the number and location of stations to be installed in the future and determining charging-level options. Six EV charging stations on campus are available to

Stanford commuters, residents and the public. In keeping with the university's addition of new photovoltaic solar arrays on campus to increase renewable and efficient energy supplies through the Stanford Energy System Innovations program, the university is developing plans to potentially expand the number of EV charging stations on campus.

In August 2013, three electric buses were added to the Marguerite fleet as a trial project. The buses will be evaluated on the busiest commuter routes, and their use may expand across the fleet if they meet performance expectations. Stanford's Parking & Transportation Services is assessing various aspects of campus growth in its continued commitment to support the academic mission of the university. TDM remains a priority sustainability program at Stanford, with implications beyond the university's main campus. With current commute trends in Silicon Valley pointing to an increase in traffic congestion, Stanford is launching a regional transportation planning initiative under the leadership of Land, Buildings & Real Estate.

Related Snapshot Stories:

- Three Dorms Tie for First in Stanford's Bike Safety Dorm Challenge
- Stanford Wins Best Workplaces for Commuters Gold Award
- Capri Now Rewards Biking and Walking in Addition to Off-peak Commutes

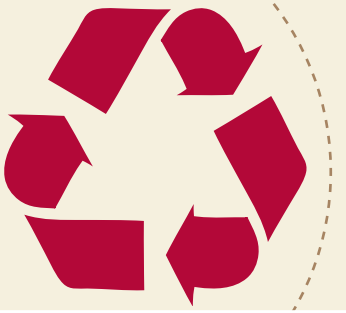
More Information:

http://transportation.stanford.edu

http://capri.stanford.edu

http://commuteclub.stanford.edu

Minimizing Stanford's Waste



WASTE MINIMIZATION

BEHAVIOR-BASED PROGRAMS

NEW BUILDINGS & RENOVATIONS

Background

Minimizing waste contributes to a more sustainable Stanford. By using less, reusing more, recycling and composting, the university saves energy, conserves water, reduces pollution, reduces greenhouse gas emissions and preserves natural resources. Stanford has increased its landfill diversion rate from 30% in 1994 to 66% in 2012 and has reduced its landfilled tonnage to an all-time low.

Stanford's waste reduction, recycling and composting program serves all academic and athletic areas, student housing and dining, faculty and staff housing, Stanford University Medical Center, SLAC National Accelerator Laboratory and construction sites. The university continually improves and expands recycling and composting collection activities, identifies new markets for waste materials and recyclables and raises awareness so that "reduce, reuse, recycle and compost" becomes an ingrained set of behaviors. Stanford partners with Peninsula Sanitary Service, Inc. (PSSI), its recycling and waste management service provider, to reduce waste, increase landfill diversion and move closer to zero waste (defined as at least 90% diversion).

Results

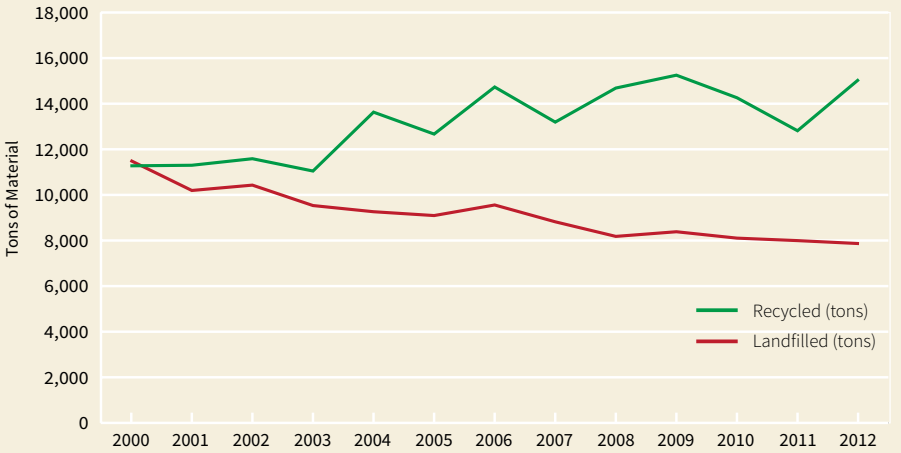
Efforts to reduce waste have steadily decreased the total amount of material Stanford sends to the landfill. Only 7,900 tons were landfilled in 2012, the lowest value recorded since tracking formally began. This year:

» Stanford's recycling rate (also referred to as a "diversion rate," the percentage of total waste diverted from the landfill) increased from 30% in 1994 to 66%

in 2012. Stanford continues to pursue a 75% recycling rate as an interim step towards the end goal of virtually no waste.

- Stanford's R&DE Student Housing worked with students to pilot compost collection in graduate housing, undergraduate housing and administrative buildings and to expand its student move-out program with a Give & Go campaign. This year, over 2,000 students participated in the move-out campaign, donating over 97,500 pounds of useable goods to local charities and diverting at least 15% of the total waste generated during move out from the landfill.
- In the RecycleMania 2013 contest, Stanford scored in the top 20 in five of the eight categories: Gorilla (7th), paper (17th), cardboard (20th), bottles and cans (17th) and food waste (17th). In addition, the university achieved its best score since first entering the contest seven years ago in the landfill per person category (meaning its lowest number of landfill tons per person).
- The Rainbow School followed Bing Nursery School's example this year by starting a composting program for its food waste.
- A deskside recycling and mini–trash can program was implemented in the Y2E2 Building, making paper recycling more convenient and bringing the building's recycling rate up to 74%.
- SLAC National Accelerator Laboratory expanded its food waste and paper towel composting program to additional office buildings as well as its premier experimental facility, the Linac Coherent Light Source (LCLS). Approximately one-third of SLAC's 1,500 staff and LCLS's visiting research scientists are now participating in the program.

Waste Diversion Trends Since 2000



Stanford sends its compostable materials to the Newby Island Compost Facility, which maintains approximately 9,500 cubic yards of compost on site.

The lowest recorded landfill value by Stanford—7,900 tons—was reached in 2012.

- Waste reduction has become a part of campus culture in many different areas, including construction. This year 92% of the construction and demolition waste generated from campus projects was recycled.
- PSSI, Students for a Sustainable Stanford and Union Underground cohosted a film screening and discussion of *Trashed*, a documentary on the global waste crisis.
- Regular waste audits of campus buildings continued to provide valuable information to the Stanford community. More than 50% of the items Stanford sends to the landfill are either recyclable or compostable. Food waste makes up the largest percentage of material sent to the landfill and remains the primary target for program development.

Academic Integration

PSSI regularly partners with faculty and student groups to conduct waste audits across campus. These events enable the campus community to experience Stanford's waste story in a hands-on setting while providing valuable data to PSSI about the content of campus landfill bins. In addition, PSSI opened its doors this year to provide tours of the university's recycling facility to classes and other groups on campus. In keeping with a tradition of engaging students with ideas for improving Stanford's waste program, PSSI worked this year to advise students on a variety of initiatives. Student projects on waste-related issues ranged from using recycled plastic on Rwandan rooftops to designing zero-waste systems and even determining what kind of bacteria one is exposed to when dumpster diving. PSSI also organized a field trip for students to visit the Newby Island Compost Facility, where Stanford sends its compostable materials.

Looking Ahead

The state of California (through AB 341) has set a policy goal of a 75% recycling rate by 2020. Building upon the best practices put in place to achieve the current 66% diversion rate, Stanford plans to meet and exceed this new target by drafting a **comprehensive and long-range waste management plan** using all its traditional and new and innovative elements of waste management. This collaborative effort will be in progress for a number of years.

In addition, PSSI will continue to focus on **increasing the availability of composting services** on campus by expanding compost collection in offices, cafés and student housing, as well as at Stanford Stadium and other event venues, using the pervasive waste audit results as a guide for expanded implementation.

PSSI will work with the Department of Athletics, R&DE and the Office of Sustainability to improve **recycling and composting at the stadiums** and increase green cleaning program practices. These projects will be part of the efforts related to Stanford's membership in the Green Sports Alliance.

Expansion of the **deskside recycling and mini–trash can system** to more campus buildings will continue to make paper recycling more convenient. Finally, to provide more detailed information to the campus community, PSSI will partner with the Office of Sustainability in an effort to determine and track **building-level waste data**, which will bring relevant information to the building rating system the Office of Sustainability is developing for 2014.

Related Snapshot Stories:

- Sustainability Remains a Hallmark of New Student Orientation
- Stanford Reduces Waste During RecycleMania Competition
- Give & Go Move Out Campaign Diverts Record Amount of Reusable Items
- Stanford Joins the Green Sports Alliance

More Information:

http://recycling.stanford.edu

http://sustainability.stanford.edu/waste

Enriched Sustainable Food and Living Programs

FOOD & LIVING

WASTE MINIMIZATION

BEHAVIOR-BASED PROGRAMS

Background

Residential & Dining Enterprises (R&DE), which comprises Student Housing, Stanford Dining, Stanford Hospitality & Auxiliaries, Stanford Conferences and Central Support Services, is one of Stanford's largest auxiliary departments. R&DE has strategically aligned itself with the academic mission of the university by providing the highest-quality services to students and other members of the university community in a sustainable and fiscally responsible manner.

R&DE provides housing and food for nearly 12,000 students and family dependents and hosts over 20,000 summer conference visitors each year in nearly 350 buildings making up one-third of the campus. R&DE is the largest provider of food service on campus, serving more than 4 million meals annually. R&DE's efforts directly impact student learning, the overall campus culture and the lives of Stanford's students after graduation.

Making sustainability a way of life is a core value within R&DE, which has two full-time sustainability professionals on staff. While there are numerous sustainability initiatives across R&DE, the most visible are R&DE Student Housing's Sustainable Living Program and R&DE Stanford Dining's Sustainable Food Program. Both programs seek to create positive impacts by collaborating with strategic partners such as vendors, suppliers, students, staff, faculty and other campus stakeholders; reporting on sustainability indicators; providing education and outreach for staff and students by lecturing, teaching and hosting sustainability events; and auditing operational practices and standards for conservation.

The **Sustainable Living Program** is committed to influencing generations of students to lead sustainable lifestyles. The program creates awareness on everything from how students can set up their rooms using environmentally preferred purchasing to the impact of plug loads and how they should interact with their residences' building design and heating and cooling systems. The program fosters behavioral change through residence workshops, competitions and campaigns that incentivize individual action. Many residences are also equipped with energy- and water-saving features to support recycling, composting and student organic gardening, thus making a sustainable lifestyle convenient.

The **Sustainable Food Program** is committed to meaningfully participating in the education of the world's future leaders by sharing knowledge and creating awareness of food culture, food systems and food production. Purchasing guidelines favor food grown using environmentally sound practices that are earth-friendly and encourage biodiversity, by farms that respect the land and are committed to ensuring future generations' food supply without compromise. Hands-on experience is offered for students throughout the year in cooking classes and at organic gardens at all of the major dining halls. The program is aligned with wellness through the EatWell program. Often the freshest, seasonal, sustainably grown ingredients not only are more nutritious, but also taste better.

Results

Key programs in the 2012-13 academic year included the following:

- A new internship program connected student interests in creating more sustainable residences with mentorship and the staff and financial resources needed for success. The program ran the full academic year, with eight students working on waste reduction, individual incentive programs and energy usage awareness. The interns received education on behavioral change and how to manage a successful project, as well as recognition for their results at the end of the year.
- The Green Move Out program, aimed at reducing waste sent to the landfill as students move out at the end of the academic year, was redesigned to increase participation and diversion. The program was rebranded as Give & Go to motivate students to "give" to their local community conveniently as they "go" on to their next adventure. The program increased outreach materials and visibility, broadened availability to multiple locations at all residences, added incentives to better track student participation and developed new service agreements with local charities to measure the donations received/waste diverted.

R&DE's "Love Food Hate Waste" campaign aims at reducing food waste through reduced plate size, better portions, a voluntary trayless program and composting.

R&DE engages students in a variety of educational programs, including workshops and events focused on gardening and sustainable food.

- Eco-charrettes were held to identify key sustainability features for upcoming new graduate and undergraduate residences. Projects will be designed to achieve 25% savings in water and energy beyond current building code requirements and will incorporate programming that supports waste diversion.
- In anticipation of offering composting across R&DE Student Housing in 2013-14, pilot projects introducing a composting option were completed in an undergraduate residence (Branner), graduate apartments (EV Studios) and an administrative office space to provide better understanding of the relevant costs, educational needs and implementation barriers. While results are pending for the graduate residence pilot, both the undergraduate and the administrative office space pilots yielded a 50% reduction in landfill waste.
- R&DE Stanford Dining/Stanford Hospitality & Auxiliaries focus on buying local, organic and fair food. Food is sourced from 200 local farmers and 21 local manufacturers, and 40% of food purchases are locally grown, raised or processed. R&DE Stanford Dining's commitments include organic apples (apples are number one on the pesticide list); organic, local spring mix from Earthbound Farms (new in 2012-13); produce from ALBA Organics (a local group that educates and provides opportunities for low-income farmworkers to start their own farms); organic, local tofu; organic, local nonfat milk from Clover Stornetta; cage-free eggs (both liquid and whole) from Wilcox Farms; Monterey Bay Aquarium Seafood Watch "good" and "best" choice sustainable seafood; 15,000 pounds of wild Alaskan salmon from Taku River Reds each year; local, grass-fed hamburger patties from Marin Sun Farms; fair-trade coffee from Starbucks; and sustainably raised pork butt from Niman Ranch.

- In partnership with the Stanford Food Project, R&DE sponsored Farm to Fork, an informal series of talks and workshops on everything from sustainable fisheries to starting your own farm. Several hundred undergraduate and graduate students participated in Farm to Fork events.
- R&DE eliminated all disposable utensils in the dining halls and eliminated most disposable coffee cups. The annual Spring Faire, which featured global street food, was attended by approximately 3,000 undergraduates, graduate students, faculty and staff, and was fully zero waste.
- R&DE's ongoing Love Food Hate Waste campaign continued to encourage students and employees to actively participate in reducing food waste. Reduced plate sizes, appropriately sized food portions, a voluntary trayless program and having diners scrape their own plates to witness the amount of food waste they are responsible for have significantly reduced food waste (and cultivated healthier eating habits) and have reduced water and energy usage for cleaning trays.
- The majority of the 200 residential conferences held during the summer of 2012 reduced paper usage and printing by eliminating conference program booklets and instead dispersing documents on USB thumb drives or storing them in an accessible cloud for attendees. In addition, many gave stainless steel water bottles as gifts to reduce bottled-water and canned-beverage service for meals and breaks.

Academic Integration

R&DE works with many schools and academic disciplines to benefit from the extensive resources of Stanford's renowned faculty. In partnership with Residential Education, R&DE supports student community building in the living and learning environment of the residential community–based dining halls. R&DE's program includes sponsoring a faculty speaker series, partnering with faculty and teaching in various classes throughout the university, and promoting food as a multidisciplinary educational experience. R&DE engages students in food issues such as those related to health, the environment, social equity and the global economy. Examples of these offerings include the Food Summit (an interdisciplinary food conference involving all seven schools at Stanford) and the Farm to Fork lecture/workshop series. Faculty regularly collaborate with R&DE to provide educational opportunities to students. In 2012-13, Maya Adam's Human Biology class *Introduction to Child Nutrition* worked with R&DE chefs who taught the students how to cook healthy, sustainable food.

In addition, R&DE hires a group of eight student gardeners each year to manage seven organic gardens across campus. These gardens, strategically located adjacent to campus dining halls, are designed to provide an experiential model of the food system for students to observe at every meal.

R&DE provides housing for more than 12,000 students on campus and works directly with residents to identify opportunities for sustainable living.

R&DE sources food from 200 local farmers and grows some of the herbs and vegetables used in the dining halls in seven gardens across campus.

R&DE also supports student groups, students working on class projects and student interns implementing projects within residences and dining halls. For example, the Green Living Council trains student coordinators in each residence who educate their peers about sustainable living and work to make their residences more sustainable.

R&DE partners with students looking to perform academic research in its facilities. This year two doctoral students studied how composting awareness and education influenced the behaviors of hundreds of graduate students in Escondido Village. Undergraduate students from Ricker researched student behavior in regard to eating less meat as part of their Mix-It-Up-Mondays program. Staff also worked with students on academic projects in journalism, design, philosophy and other classes.

Looking Ahead

R&DE's sustainability programs have many enhancements under way. Next year's projects include the following:

- Rolling out education and infrastructure for composting at all residences, dining halls and cafes
- Evaluating procurement policies and service agreements to further enhance environmentally preferred purchases of everything from paper and cleaning products to food
- Continuing to move forward on improving utilities management through a new platform that allows more access and flexibility with usage data and installation of more smart meters

R&DE Student Housing works directly with students to expand sustainability programs in housing.

R&DE supports student efforts to promote conservation campaigns in residence halls, including facilitating the installation of smart water meters for the "Water Wars" competition.

- Developing additional food-related curricula with faculty that explore theoretical frameworks through the lens of meaningful, practical and hands-on experiences. Next fall, R&DE will bring back the popular *Grow It, Cook It, Eat It* class and plans to create more hands-on workshops and classes for students and staff in the gardens.
- Continuing to design awareness events and ongoing sustainability campaigns in alignment with and support of R&DE's strategic partners
- Expanding opportunities for students to design, implement and manage Sustainable Food Program and Sustainable Living Program initiatives
- Integrating R&DE's internships with other sustainability internships under the new Sustainable Stanford Internship Program
- Establishing an ongoing initiative with faculty, researchers and student groups to implement creative design solutions that promote and encourage healthy and sustainable behaviors in the dining halls and residences
- Working with the Department of Athletics to implement sustainable food management at concessions at stadiums as part of the university's efforts as a member of the Green Sports Alliance
- Fully integrating R&DE's culinary standards and sustainable food purchasing metrics into its internal reporting processes, with the goal of doubling sustainable food purchases by 2015
- Achieving 100% transparency for all food purchases, including origin, production method, ownership structure and labor practices

Related Snapshot Stories:

- R&DE Continues Commitment to Local Foods with Organic Salad Greens Mix
- R&DE Stanford Dining Hall Gardens Get Growing
- Arrillaga Family Dining Commons Hosts Inaugural Earth Day Dinner
- R&DE Student Housing Celebrates Student Sustainability Contributions
- Give & Go Move Out Campaign Diverts Record Amount of Reusable Items.
- Stanford Joins the Green Sports Alliance

More Information:

http://stanford.io/16eAEkQ

Sustainability in Academia

Stanford has long been a leader in cutting-edge research and innovative teaching on energy, the planet's resources and environmental sustainability. Driven by an entrepreneurial spirit and historic dedication to public service, Stanford is well positioned to seek solutions that create a more livable planet and educate generations of scientific and policy leaders equal to that challenge. Central to Stanford's approach to sustainability research and curricula is the idea that solutions to the world's environmental problems will require an interdisciplinary effort.

Today, dozens of laboratories, research centers and student organizations at Stanford are working to solve the most urgent challenges facing humanity, from food security and clean water to global warming and clean energy. All seven schools at Stanford offer a wide range of environmental and sustainability-related courses and research opportunities, with over 750 sustainability-related graduate and undergraduate courses offered across campus.

The following sections outline how Stanford's scientists, researchers, faculty and students continue to deliver novel and high-impact solutions to address a range of sustainability issues.

Solutions-Oriented Research & Teaching

TRAINING & EDUCATION

INTERDISCIPLINARY RESEARCH

STUDENT LEADERSHIP & ACTIVITIES

A History of Sustainability at Stanford

Early Frontier

Stanford's academic focus on the Earth and its resources dates back to the founding of the university in 1891. The first professor hired – John Casper Branner – and the first recipient of a Stanford doctorate were both geologists. In the early 20th century, Stanford built on that foundation, pursuing use-inspired research in areas such as energy and natural resources, serving as a pioneer in the scientific study of groundwater. In fact, also among the first cohort of faculty hired at Stanford was Charles David Marx, the first chairman (1912-15) of the California State Water Commission, who helped frame the water laws of this state.

Over the years, innovative research continued with a focus on energy resources, biological conservation and global environmental change. In 1962, Rolf Eliassen and Perry McCarty started the first broad, interdisciplinary environmental engineering program in the country at Stanford. In 1973, the university created the 1,200-acre Jasper Ridge Biological Preserve above the campus; the preserve continues to serve as a living laboratory for ecosystem and climate research. In addition, several academic programs launched decades ago are still going strong, including the Energy Modeling Forum, founded in 1977, and the Center for Conservation Biology, established in 1984.

Development of an Interdisciplinary Approach

In the 1990s, a group of visionary faculty members began to recognize that addressing key global sustainability challenges, such as climate change and universal access to clean energy, water and food for a growing population, would require the collaboration of experts from many disciplines. At the heart of this evolution was, and remains, the belief that sustainability challenges cannot be addressed by individual disciplines working alone, but must draw on every discipline and field across campus and beyond. During this period, the interdisciplinary Earth Systems bachelor of science and coterminal master's programs were launched within the School of Earth Sciences. The Center for Environmental Science and Policy was also created within the Freeman Spogli Institute of International Studies, bringing together faculty from a range of disciplines to focus on challenges at the interface of e nvironment and development.

As the Stanford community grew in size and experience with interdisciplinary research, faculty called for graduate programs for interdisciplinary students. In 2001, the Emmett Interdisciplinary Program in Environment and Resources was founded within the School of Earth Sciences. The program was proposed by faculty from across the university and established on their behalf. Likewise, cross-cutting research efforts continued to flourish. In 2002 the Global Climate and Energy Project (GCEP), an industry partnership that supports innovative research on game-changing energy technologies, was formed. To date, GCEP has funded 80 research programs at Stanford and 26 other institutions in 10 countries. GCEP had a transformative affect across campus, unleashing long-term faculty interest in energy and providing new opportunities for students in the energy field.

In 2003, Stanford President John Hennessy worked with an ad hoc Provost's Committee on the Environment to launch the campus-wide Initiative on the Environment and Sustainability. The following year he launched the Stanford Woods Institute for the Environment to serve as the initiative's central organizing force. Envisioned as a hub for Stanford's environmental researchers, the new institute brings together experts from across the university's seven schools to pursue interdisciplinary, solutions-oriented research addressing the planet's most complex environmental challenges while preparing the next generation of environmental leaders. Centers and programs within the Woods Institute include the Center for Ocean Solutions, the Center for Food Security and the Environment (joint with the Freeman Spogli Institute for International Studies) and Water in the West (joint with the Bill Lane Center for the American West). A detailed list of centers and programs is available in the next article.

In 2009, President Hennessy announced the creation and formalization of the Precourt Institute for Energy (PIE) and the TomKat Center for Sustainable Energy. In 2011, the Stanford Law School and the Graduate School of Business jointly

The School of Earth Sciences now offers a Sustainable Food and Agriculture track option under the Earth Systems undergraduate program.

The Energy@Stanford & SLAC conference provides an opportunity for students to get connected to the array of energy research and education opportunities both on campus and at SLAC.

established the Steyer-Taylor Center for Energy Policy and Finance. Today, PIE serves as the campus-wide hub of energy research and education, providing support to more than a dozen energy research centers and programs, including the TomKat Center, the Steyer-Taylor Center and the Precourt Energy Efficiency Center, which predated PIE. A complete list of these centers is available in the next article. In addition, two new interdisciplinary departments – Environmental Earth System Science and Energy Resources Engineering – were created in the School of Earth Sciences, complementing the efforts of many disciplinary departments across the university.

Over the decades, the academic programs and initiatives in sustainability have achieved remarkable breadth, contributing to Stanford's international reputation for solving major environmental and energy-related challenges.

Sustainability Courses and Programs

Stanford schools and departments independently offer an array of courses, degree programs and research opportunities focusing on sustainability. All seven degree-granting schools on campus incorporate courses in sustainability, with interdisciplinary institutes and programs complementing sustainability research and curriculum across all schools.

Coursework

In spring 2013, a cross-campus Student Energy Curriculum Review Panel met and developed a searchable database of 400+ Stanford energy courses, which is available on the PIE website. Similar efforts around agriculture and water

resources are under way. Many departments around the university offer courses focusing on environmental, resource and sustainability issues, although the largest numbers are offered in the departments of Civil and Environmental Engineering, Environmental Earth System Science, Anthropology and Biology, and in the Earth Systems Program.

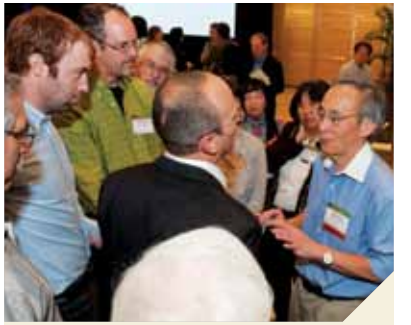
New courses announced or available in 2012-13 include:

- *Energy in Transition: Technology, Policy and Politics,* Cathy Zoi, autumn 2012
- *Thermodynamics of Energy Conversions at the Nanoscale,* William Chueh, spring 2012
- *Energy and Africa*, Chris Edwards, Cape Town, South Africa, winter 2013
- *Sustainability and Collapse*, Thinking Matters team, autumn 2012
- *Energy Policy, Markets, and Climate Change*, Donald Kennedy, winter 2012
- *Solar Cells, Fuel Cells & Batteries*, Class2Go, Bruce Clemens, MOOC (10,000 students), autumn 2012
- *Molecular Engineering of Energy Technologies*, Graduate Certificate, Stanford Center for Professional Development, Bent, Robertson, Frank, Norskov, Spormann, Jaramillo, winter/spring 2013
- Sustainable Food and Agriculture track option under Land Systems and Land Use, Earth Systems undergraduate program, School of Earth Sciences
- *Feeding Nine Billion*, David Lobell, autumn 2013
- *Transitions to Sustainability*, Pamela Matson and Jeffrey Koseff, winter 2014 (announced in 2012-13)

Sustainability in Stanford's Schools

Across campus, Stanford's schools are integrating sustainability into research and academic programs. Some highlights from 2012-13 include the following:

- After four years as the U.S. secretary of energy, Nobel laureate Steven Chu returned to Stanford as a professor of physics **(School of Humanities and Sciences)** and of molecular and cellular physiology **(School of Medicine)**.
- Former U.S. senator and Stanford Law School alumnus Jeff Bingaman joined the **Steyer-Taylor Center** (jointly **Law School** and **Graduate School of Business**) as a distinguished fellow to develop policies to assist states and local communities in promoting increased use of clean energy.
- **Stanford Law School's** Environmental and Natural Resources Law and Policy Program, the Center for Ocean Solutions, the *Stanford Environmental Law Journal* and the *Stanford Journal of Law, Science and Policy* organized an international symposium on adaptive marine reserves.



After four years as the secretary of energy, Nobel laureate Steven Chu has returned to Stanford as a professor of physics and molecular and cellular physiology.

Stanford Law School organized an international symposium on adaptive marine reserves this year, in partnership with the Center for Ocean Solutions, the Stanford Environmental Law Journal and the Stanford Journal of Law, Science and Policy.

- The **Emmett Interdisciplinary Program in Environment and Resources** is home to both doctoral programs and joint master of science programs with the **Graduate School of Business, Law School** and **Medical School**. This year, students in the joint master's program presented final capstone projects, including starting a company to develop large-scale pumped-hydro energy storage in Chile; applying an algorithm to identify energy waste in buildings; and presenting an amicus brief to the Ninth Circuit Court of Appeals to argue that California's AB 32 should include life cycle analysis for ethanol.
- The **School of Medicine's** magazine, Stanford Medicine, published a special report looking at the connection between health and the environment through the work of Stanford Woods Institute senior fellows and others. The School of Medicine's annual Stanford Food Summit continues to build upon past success in educating academic and external communities on the link between nutrition and health.
- The **School of Earth Sciences** (which focuses solely on Earth resources, hazards and environmental issues) led a campus-wide discussion on key gaps in faculty expertise, and is now planning to increase faculty strengths in the human dimensions of sustainability concerns. The school is also leading discussions around the development of sustainability degrees at the undergraduate and graduate levels.
- The **Graduate School of Business** hosted the Stanford Responsible Supply Chains conference in fall 2012. The event brought together over 150 corporate executives, nonprofit leaders, policymakers and academics to explore

creating shared value within the entire supply chain by looking beyond the perceived trade-offs among economic efficiency, social progress and environmental protection.

» ReNUWIt, a National Science Foundation–sponsored engineering research center, began its first full year of operations. Led by researchers at Stanford's **Civil and Environmental Engineering Department**, ReNUWIt is a multi-institution research center (Stanford, University of California at Berkeley, Colorado School of Mines and New Mexico State University). Its goal is to change the ways we manage urban water to achieve a vision of safe, sustainable urban water infrastructures that are enabled by technological advances in natural and engineered systems and informed by a deeper understanding of institutional frameworks.

Interdisciplinary Institutes

Stanford's interdisciplinary institutes, including the Woods Institute and PIE, offer a diverse array of sustainability-related research and academic opportunities to examine environmental problems through cross-disciplinary collaboration.

» **Stanford Woods Institute for the Environment:** The Woods Institute works to protect and nurture our planet so it can meet the vital needs of people today and of generations to come. As the university's hub for interdisciplinary environmental scholarship, Woods pursues this mission by catalyzing breakthrough, solutions-focused research by Stanford's faculty, researchers and students. The institute convenes global experts for research collaborations, workshops and dialogues. Woods prepares students, scientists, professionals and decision makers to serve as environmental leaders through innovative leadership programs. The institute also actively links research to action, informing decision makers with unbiased scientific data while advancing decisions central to solving the world's most critical, complex environmental challenges.

» **Precourt Institute for Energy:** PIE serves as the hub of energy research and education at Stanford. The institute fosters opportunities for scientists, engineers, social scientists and legal and business scholars to solve the world's energy problems. PIE's seed grant program has provided funding to more than 30 faculty members to conduct research with the potential for high impact on energy supply and use. The institute also encourages energy literacy via a monthly energy newsletter and by sponsoring numerous educational programs and forums, including the weekly Energy Seminar and the annual Energy@Stanford & SLAC conference for incoming graduate students.

Looking Ahead

Stanford's faculty is actively pursuing creation of a sustainability certificate program. Implementation of recommendations from the 2010 Study of Undergraduate Education at Stanford (SUES) is ongoing. Appointed by Provost John Etchemendy in January 2010, SUES reviewed the curriculum for undergraduate education to ensure that requirements reflect Stanford's stated academic goals. The resulting report summarized recommendations for redesigning undergraduate education to emphasize skills and capacities and ways of thinking and doing, in an effort to encourage students and teachers to reconsider what they do, how they do it and why it matters. The first year of new breadth requirements for all students, entitled Ways of Thinking/Ways of Doing, will be 2013-14. This new system shifts undergraduate requirements from a discipline-based to a capacity-based model, recognizing the diversity of approaches to learning within any given discipline and the value of interdisciplinary research. Under the new system, future sustainability-related courses may count for more breadth requirements, enabling students not previously able to take a sustainability course to fit one into their schedule. Faculty and staff also continue to expand the number of hands-on, service-learning courses that solve problems within the university and elsewhere in the world.

Related Snapshot Stories:

» Incoming Graduate Students Explore Energy@Stanford & SLAC

» Earth Systems Announces New Food and Agriculture Track

» Jasper Ridge Biological Preserve Celebrates 40th Anniversary

» Interdisciplinary Team Hosts Third Annual Food Summit

More Information:

» Initiative on the Environment and Sustainability: stanford.io/19t5SbI

» School of Earth Sciences: earthsci.stanford.edu

» Stanford Woods Institute for the Environment: woods.stanford.edu

» Stanford Precourt Institute for Energy: energy.stanford.edu

Innovative Interdisciplinary Research

INTERDISCIPLINARY RESEARCH

TRAINING & EDUCATION

STUDENT LEADERSHIP & ACTIVITIES

Innovative and Solutions-Oriented Research

Researchers at Stanford continue to set the bar for interdisciplinary collaboration and development of research projects that have practical impact both locally and around the world. Stanford's interdisciplinary institutes have the distinction of appointing their own faculty, allowing researchers to carry out cross-disciplinary work most effectively. With significant breadth and depth across multiple related sustainability fields, Stanford researchers are leading the way in everything from clean technology improvements to sustainable development.

Focal areas of active solutions-oriented research at Stanford include energy; freshwater; oceans and estuaries; ecosystem services; food security, land use and conservation; biodiversity; sustainable development; climate; and public health. Below, a few selected research initiatives and related 2012-13 accomplishments are highlighted as a means of illustrating the vast array of research activities under way at Stanford.

Energy

Stanford has more than 200 faculty conducting research in renewable energy conversion, energy efficiency, advanced fossil fuel resources, advanced energy materials, transmission and distribution, transportation, energy impacts and policy, economics and politics. Highlights from 2012-13 research initiatives include:

Significant advances in metal-air and silicon battery technologies

- Stanford scientists created an advanced zinc-air battery, a potential low-cost alternative to conventional lithium-ion batteries. The results were published in the May 2013 volume of the journal *Nature Communications*.
- A Stanford research team dramatically improved the performance of lithium-ion batteries by creating novel electrodes made of silicon and conducting polymer hydrogel. Results were published in the June 2013 volume of the journal *Nature Communications*.

Creation of the first solar cell made entirely of carbon

- Stanford researchers developed the first solar cell made entirely of carbon, an inexpensive substitute for the pricey materials used in conventional solar panels. Results were published in the journal *ACS Nano*.

A study finding that the global photovoltaic industry has become a net electricity producer

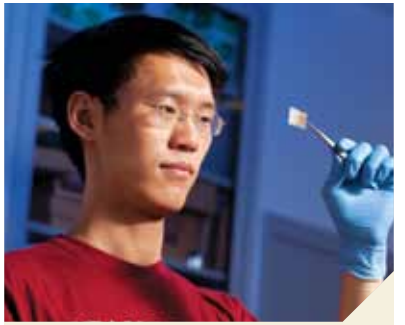
- For the first time, the electricity generated by the global photovoltaic industry has surpassed the amount of energy used to produce the solar modules, say researchers at the Global Climate and Energy Project. The study was published in the April 2013 edition of *Environmental Science & Technology*.

The launch of the Energy Innovation Transfer Program at the TomKat Center for Sustainable Energy

- Created to help Stanford inventors bridge the gap between research and commercialization, the Energy Innovation Transfer Program assists Stanford faculty, staff and students with research funding and prototype development and provides mentors to guide research teams through the commercialization of inventions.

In addition to the initiatives highlighted above, the following centers and programs, which interact through the Precourt Institute for Energy, represent significant strands in the fabric of interdisciplinary energy research at Stanford:

- Bay Area Photovoltaic Consortium
- Center for Advanced Molecular Photovoltaics
- Center on Nanostructuring for Efficient Energy Conservation
- Energy Modeling Forum
- Global Climate and Energy Project
- Precourt Energy Efficiency Center
- Program on Energy and Sustainable Development



Stanford has more than 200 faculty conducting energy research in areas such as renewable energy conversion and advanced energy materials.

The Global Climate and Energy Project, an industry partnership that supports research on game-changing energy technologies, celebrated its 10 year anniversary this year.

- Shultz-Stephenson Task Force on Energy Policy
- Stanford Environmental and Energy Policy Analysis Center
- Stanford Institute for Materials & Energy Science
- Steyer-Taylor Center for Energy Policy and Finance
- SUNCAT Center for Interface Science and Catalysis
- TomKat Center for Sustainable Energy

The School of Earth Sciences also supports a number of energy research initiatives and programs, including the Stanford Geothermal Program, the Stanford Center for Carbon Storage and the Environmental Assessment and Optimization Group.

Freshwater

Changes in human and natural systems will drive serious threats to freshwater resources in the 21st century. Stanford researchers are working to generate policy evaluation models, provide targeted analyses of viable policy interventions and train the next generation of water resource experts. Highlights from 2012-13 research initiatives include the following:

- **Global Freshwater Initiative (GFI):** Researchers with GFI, an initiative of the Stanford Woods Institute, are developing strategies to promote the long-term viability of freshwater supplies for people and ecosystems threatened by climate change, shifts in land use, increasing population and decaying infrastructure.

In October 2012, GFI researchers published the first study to systematically analyze and classify water crises around the world. Published in Water Resources Research (Vol. 48), the study involved careful reading, coding and pattern-hunting among papers on 22 water crises from the Yellow River in China to the Aral Sea in Yemen.

» **Program on Water, Health & Development:** Working with partners in Asia, Africa and the Caribbean, researchers with this Stanford Woods Institute program are identifying ways to improve and increase the sustainability of water supply and sanitation service delivery, while also enhancing capacity for sustainable water and wastewater management in some of the world's poorest countries.

In December 2012, the U.S. Environmental Protection Agency (EPA) awarded a prestigious grant to the program's Stanford Dhaka Water Project for developing a device to disinfect drinking water without relying on electricity or moving parts. The in-line chlorinator is designed for low-income urban areas that rely on shared drinking water points and is being tested in Dhaka, Bangladesh.

» **Water in the West Program (WitW):** WitW, a joint program of the Stanford Woods Institute and the Bill Lane Center, examines the root causes of water challenges and develops practical tools and technologies to deal with them.

WitW research and staff are assisting the National Fish and Wildlife Foundation in the development of its western water conservation strategy, which will help determine the foundation's investment priorities in seven critical ecoregions.

» **Center for Groundwater Evaluation and Management (GEM):** The GEM Center, housed within the School of Earth Sciences, provides a cross-cutting approach to research on groundwater evaluation and management, with a focus on integration of data to monitor and model subsurface hydrologic processes.

A Stanford-led team of researchers affiliated with the GEM Center pioneered a new way to survey the thawing Arctic permafrost. The team's research findings were published in the January 2013 volume of *Geophysical Research Letters*. This research may help advance understanding of how permafrost thaw could impact the future climate.

Oceans and Estuaries

Approximately 1 billion people depend on the ocean for sustenance and livelihoods. Stanford researchers are finding ways to improve ocean health by applying the best available science and policy expertise to challenges such as ocean governance, ocean acidification and sea level rise.

The Kelp Forest Array, launched this year, is a state-of-the-art platform in California's Monterey Bay kelp forest that allows a variety of oceanographic instruments to deliver real-time data to researchers.

The U.S. Environmental Protection Agency awarded a prestigious grant to the Stanford Dhaka Water Project this year for developing a device to disinfect drinking water without relying on electricity.

Highlights from 2012-13 research initiatives include the work of the Center for Ocean Solutions (COS). Researchers with COS, a program of the Stanford Woods Institute, Stanford's Hopkins Marine Institute, the Monterey Bay Aquarium and the Monterey Bay Aquarium Research Institute, are developing practical solutions by integrating advanced science and technology with economic, legal, social and political expertise.

In September 2012, COS researchers developed the Kelp Forest Array as a platform for climate change monitoring efforts in California's delicate coastal ecosystems. The array provides data and electric laboratory infrastructure in the kelp forests just offshore of Stanford's Hopkins Marine Station in Pacific Grove, California. With a broadband cable, the array will allow a wide variety of oceanographic instruments to deliver data to researchers in real time.

Food Security, Land Use and Conservation

Interdisciplinary researchers across a number of institutes, centers and initiatives are focused on addressing the challenges of providing for the world's growing population without depleting the planet's natural resources. Highlights from 2012-13 research initiatives include the following:

» **Center on Food Security and the Environment (FSE):** An interdisciplinary team of scholars at FSE, a joint effort of the Stanford Woods Institute and the Freeman Spogli Institute, designs new solutions to help alleviate global hunger, poverty and environmental degradation, train scholars and policy leaders and provide sound policy advice on issues related to agricultural development, food and nutrition security and climate change.

The Ecological Society of America selected School of Earth Sciences Dean Pamela Matson and a team of 14 interdisciplinary researchers (including seven FSE affiliates) to receive its 2013 Sustainability Science Award for their work on the 2011 book *Seeds of Sustainability: Lessons from the Birthplace of the Green Revolution*.

» **Natural Capital Project (NatCap):** NatCap, a joint venture of the Stanford Woods Institute, the Nature Conservancy, the World Wildlife Fund and the University of Minnesota's Institute on the Environment, develops software-based tools to enable decision makers to quantify nature's values, assess trade-offs associated with alternative land use choices and integrate conservation and human development into land and water use and investment decisions.

  A new study from NatCap researchers, published July 14 in the journal Nature Climate Change, provides the first comprehensive map of the entire U.S. coastline. The NatCap study shows the locations and amounts of protection communities get from natural habitats, such as sand dunes, coral reefs, sea grasses and mangroves.

» **The Osa & Golfito Initiative (INOGO):** The Stanford Woods Institute's INOGO (the acronym for the initiative's name in Spanish) is helping to facilitate the development of a strategy for sustainable human development and environmental stewardship in Costa Rica's ecologically sensitive Osa and Golfito region.

  Over the past year, INOGO has produced five case studies on key issues in the Osa and Golfito region, including the potential impacts of a proposed hydroelectric dam and a proposed international airport and the socioeconomic and biological impacts of expanding oil palm plantations.

In addition to the initiatives highlighted above, the following centers and programs, which interact through the Stanford Woods Institute for the Environment, represent significant strands in the fabric of interdisciplinary environmental research at Stanford:

» Center for Ocean Solutions

» Center on Food Security and the Environment

» First Nations Futures Program

» Fisheries Leadership and Sustainability Forum

» Global Freshwater Initiative

» Initiative on Osa and Golfito

» Leopold Leadership Program

» Natural Capital Project

» Program on Water Health and Development

» Program on Water in the West

» Stanford Environment and Energy Affiliates Program (joint with PIE)

The School of Engineering also supports a number of environmental research initiatives, including ReNUWIt, the Center for Global Projects and the Center for Sustainable Development and Global Competitiveness.

Looking Ahead

Now in its ninth year of operation, the **Stanford Woods Institute** is developing a number of new initiatives to engage leaders in business, government and nongovernmental organizations, with an increased emphasis on the corporate sector. On the horizon for 2013-14: realizing the complete potential of the Woods keystone program – **Environmental Venture Projects (EVP)**. A move toward "EVP 2.0" will connect researchers with advisors and key decision makers in the public and private sectors, with a focus on moving research into action. Woods is working to advance implementation of EVP and other solutions produced by its research community at a scale commensurate with the world's most pressing environmental challenges. Plans are also being developed for the second phase of INOGO, the Initiative on Osa and Golfito which focuses on sustainable development in one of the world's most important centers of biodiversity. Activities will include education and leadership training programs to enhance environmental decision making and stewardship and the development of a green economy, and research projects on the Golfo Dolce and the proposed Diquis Dam watersheds.

The **Precourt Institute for Energy** will build upon and expand research efforts in a number of areas, including natural gas, energy storage, integration of renewable energy resources into the electric grid and energy access in the developing world. The Stanford Water-Energy Program (joint with the Woods Institute) will continue to address the potential for, and barriers to, renewable energy generation in the water and wastewater sectors; integration of local water supply development and energy efficiency; and sustainable management of surface and groundwater resources used in energy production.

Growing interest among the Stanford faculty in batteries and energy storage continues to generate new research initiatives and support, including participation by Stanford and SLAC in the Department of Energy's new Joint Center for Energy Storage Research, a five-year, $120 million initiative aimed at achieving game-changing advances in battery performance. In the area of energy systems integration, Stanford will continue work on a variety of challenging topics, including energy efficiency, transmission siting, utilities and regulation, wholesale market regimes and smart-grid optimization.

The **Stanford Challenge** provided all seven schools with resources to build or augment sustainability programs and initiatives. The **School of Earth Sciences** (SES) will continue to focus on the broadening concerns of energy, water, agriculture and land change, minerals, environment and hazards and risks. SES plans to complement its faculty expertise in the physical sciences and engineering with increased expertise at the interface of coupled human-environment interactions to address both societal needs and student interests. At the same time, SES will advance its use of complex technologies, such as remote sensing, satellite imaging and high-performance computing, in both research and teaching.

The School of Humanities and Sciences also plans to recruit social sciences faculty whose research engages with environment and sustainability challenges. Searches will be carried out in the coming year, with the expectation of hiring at least two new faculty in this area.

Related Snapshots:

- Faculty Awarded Millions for Innovative Energy Research
- GCEP Celebrates 10th Anniversary at Annual Symposium
- Interdisciplinary Team Hosts Third Annual Food Summit
- Stanford Scientists Help Cut Solar Cell Costs, Expand Uses
- Dhaka Water Project Wins EPA Grant
- *National Geographic* Honors Solar Market Garden Project
- Energy Seminar Launches Entrepreneurship Miniseries
- Global Food Policy and Food Security Symposium Highlights Africa's Food Systems
- Stanford-MIT Energy Game-Changers Hold Workshop in D.C.
- Connecting the Dots Explores Sustainability Interconnections
- TRACERS Antarctica Research Voyage Concludes
- Experts Convene to Address the Future of Groundwater
- re.source Wins "Best Overall Solution" at WEST Summit
- Stanford Scientists Urge Action on Climate Change
- Law School Symposium Addresses Dynamic Ocean Conservation Issues
- Global Energy Assessment Provides Roadmap to Sustainable Energy for All
- GCEP Tackles Sustainable Energy for the Developing World
- Silicon Valley Energy Summit Convenes Sustainable Business Leaders

More Information:

- Research groups at the School of Earth Sciences: earthsci.stanford.edu/research-groups
- Research centers at the Stanford Woods Institute: woods.stanford.edu/research/centers-programs
- Energy research centers and programs at Stanford: energy.stanford.edu/research

Student Leadership & Activities

STUDENT LEADERSHIP & ACTIVITIES

TRAINING & EDUCATION

COMMUNICATIONS & OUTREACH

Background

Students interested in sustainability at Stanford can find sustainability-focused and -related student groups, academic courses, majors, internships and research opportunities with faculty and staff. Student ideas often galvanize change on campus and lead to improved sustainability offerings.

More than 20 student groups at Stanford work towards increased sustainability. Most of these groups include both undergraduate and graduate students, leveraging talent and passion to initiate change in everything from slow food to green living and solar cars. Students are the core of the Stanford community, and their enthusiasm results in remarkable outcomes every year.

Highlights

Student Group Accomplishments

Student groups provide opportunities for students to explore their passion and apply their interest in sustainability to solving real-world problems on campus and beyond. The accomplishments of these groups in 2012-13 included the following:

» **Students for a Sustainable Stanford** organized a number of events throughout the year to raise student awareness of environmental issues. Most notable were Al Gore's delivery of the first annual Stephen H. Schneider Memorial Lecture (in collaboration with Stanford in Government, Speakers Bureau, the Woods Institute and the Haas Center for Public Service), the Mimi and Peter E. Haas Spring Distinguished Visitor Workshop Series with Dr.

Jane Lubchenco, and the eARThbeat festival (in collaboration with Stanford Organizing Committee for the Arts).

- **The Stanford Energy Club** hosted a number of networking events and visits to local cleantech companies throughout the year. In spring quarter, it also organized Stanford Energy Week, a week of cross-campus collaboration on high-quality energy-centric events. Some of this year's highest-impact events were a lecture by Al Gore and a technology and research showcase by students and local startups.
- The Stanford Farm Project renamed itself the **Stanford Food Project**, acknowledging its growth in scope since its founding in 2010. The group aims to foster a student community and movement focused on food and farming at Stanford. The group hosted 24 "Farm to Fork" events in 2012-13, including cooking workshops, guest speakers and discussions.
- **CALPIRG Energy Service Corps** started a Stanford campus chapter this year. The group works to help individuals save energy, money and the environment through energy efficiency and weatherization efforts. In its inaugural year, the group taught over 3,000 local K-12 students about saving energy, completed home energy surveys with 330 residents and weatherized four buildings housing nonprofit organizations in Palo Alto.

Student Projects

Green Fund

Having completed its fifth year, the Student Green Fund continues to foster student engagement by encouraging leadership in sustainable improvement projects on campus. The Office of Sustainability awarded $30,000 in grants to projects addressing a range of campus sustainability topics. A final report detailing all 2012-13 projects is publicly available online. Reports from each year provide a database of previous projects to inspire students to build upon past successes and enable them to learn from their predecessors. This year's projects reached across the university to tackle sustainability in a variety of forms, as described below.

- **iWater App**
  Students developed an iPhone app to report irrigation leaks on campus. Reporting categories include misaligned or broken sprinklers and broken pipes. The app was officially launched in winter, and reports are being automatically directed to facilities. Eventually, the app may be expanded to serve as a resource for reporting other maintenance needs across campus, such as downed tree branches or overflowing waste bins.
- **Water Wars/Energy Wars**
  The Green Living Council expanded upon last year's competition to host simultaneous water- and energy-saving competitions in select

The Solar Charging Station Project piloted a solar charging station on campus in spring, and hopes to design, build, and house their own station in the year ahead.

The Farm to Fork project held a series of 24 events throughout the school year aimed at teaching students about fresh, local and sustainable food.

campus dorms during April. The competitions were facilitated by online dashboards providing real-time energy and water use monitoring. During the competition, participating dorms reduced electricity consumption by over 10,000 kilowatt-hours and water consumption by over 12,000 gallons.

- **Solar Charging Station**
  The Solar Charging Station Project aimed to engage students in the design and fabrication of an off-the-grid solar charging station for the Stanford campus. The station will serve as a new outdoor study hotspot equipped with electrical outlets, allowing students to enjoy the great California weather while exploring the possibilities of solar energy. The project design phase took place during spring quarter, and fabrication will occur in the fall.
- **Closetloop**
  Closetloop is an online fast-fashion commerce platform geared towards the sustainability of clothes. The website allows students to exchange reusable old clothes with others on campus, promoting sustainability and reducing textile waste in the process. The website was developed over the course of the academic year and will launch campus-wide in the fall.
- **Farm to Fork Workshop Series**
  Farm to Fork is a series of dinners, discussions and interactive workshops designed to foster an open dialogue on the future of food and agriculture and educate the Stanford community about the environmental, social and health concerns tied to the food system. Twenty-four events throughout the school year included discussions with activists, dinners with local farmers and workshops on topics like beekeeping and raw food.

» **Synergy Rainwater Harvesting System**
Students planned for a 1,500-gallon rainwater catchment and drip irrigation system at Synergy House. The system will be educational for residents and will conserve water resources in a state where water is an increasingly precious commodity. System installation is currently scheduled to occur over the summer.

» **Bin to Bucket Graduate Housing Composting Program**
Bin to Bucket aimed to increase composting in graduate student housing through a series of interventions, including provision of personal compost bins, informational sessions and educational materials. The interventions led to a significant increase in composting behavior, and students plan to expand the program next year.

List of Sustainability-Related Student Groups

- **Appetite for Change:** promotes education and conversation about the food we eat and how it relates to larger global issues
- **ASSU Green Store:** serves as an online store and delivery service for the Stanford community to purchase eco-friendly products for events and campus life
- **CALPIRG Energy Service Corps:** reaches out to local schools and homes to educate individuals and help them reduce their energy use and upgrade the efficiency of community buildings
- **Engineers for a Sustainable World:** brings engineering students together to address global poverty and sustainability issues. The Stanford chapter of this national nonprofit organization was founded in 2003 and has projects in Latin America and India and at Stanford's Farm.
- **GAIA (Green Alliance for Innovative Action):** increases intergroup communication and information and resource sharing among Stanford student groups, faculty and staff focused on sustainability
- **Green Events Consulting:** works to help make events on campus as environmentally sustainable as possible, to increase the number of green events and to educate organizers on best practices
- **Green Living Council:** through education and outreach on environmental issues and best practices, engages the student body in green living
- **GRID Alternatives:** focuses on educating local low-income communities on the importance of alternative energy sources and helping to provide them with energy efficiency services
- **GSB Energy Club:** hosts speakers and panels on energy issues, offers career resources to students and connects the graduate energy community
- **GSB Sustainable Business Club:** connects students with business, technology and policy leaders in sustainability
- **SEEDS:** aims to advance the profession of ecology through educational opportunities such as field trips and research fellowships. SEEDS is the Stanford chapter of the national education program of the Ecological Society of America.
- **Solar Decathlon:** is building a 1,000-square-foot home designed with clean technology for sustainable living. This is part of a competition hosted by the U.S. Department of Energy to promote solar technology.
- **SPOON:** aims to raise awareness about hunger and malnutrition by salvaging unused food from dining halls, restaurants and events to deliver to the Opportunity Center in Palo Alto
- **Stanford Energy Club:** serves as an umbrella organization for all energy groups on campus, promoting events and facilitating resource sharing
- **Stanford Environmental Consulting:** provides consulting services to nonprofits and companies interested in addressing their environmental problems
- **Stanford Food Project:** aims to foster a student community centered on food and farming at Stanford and organizes the Farm to Fork series and the Farm Stand.
- **Stanford Solar and Wind Energy Project:** aims to develop renewable energy resources at Stanford, educate the community on energy projects and offer students practical career experience
- **Stanford Solar Car Project:** designs and builds solar-powered cars to race in the World Solar Challenge in the Australian Outback
- **Students for a Sustainable Stanford (SSS):** focuses on climate and energy, environmental justice, waste and water issues. Formed in 2000, SSS has become one of the most prominent environmental groups on campus.
- **Union Underground:** enables students to give or get items for free, including clothing, books and dorm room items. This student-run free store also serves as a new student art gallery and creative space.

New student group Appetite for Change works to educate the campus community on the benefits of reducing meat consumption.

The Stanford Solar Decathlon Team's Start.Home will compete in the national Solar Decathlon competition in December 2013.

Mel Lane Student Grants Program

In honor of environmental leader Mel Lane, the Stanford Woods Institute for the Environment provides grants for environmental projects driven and managed by students. Projects must involve Stanford students and provide an educational experience for both students and the broader community. Projects are selected based on their potential to make a measurable impact on sustainability issues through action or applied academic research. Preference is given to projects that focus on environmental sustainability within one of the following topic areas: climate, ecosystem services and conservation, food security, freshwater, oceans, public health and sustainable development. Projects funded in the 2012-13 academic year included Bay Area Tropical Forest Network (Kelly McManus),Ocean Treasure Film Festival (Coastal Society–Stanford Chapter), Renewable Energy Design for Indonesia Project (Engineers for a Sustainable World) and San Francisco Bay Offshore Wind Resource Assessment and Educational Engagement (Stanford Solar and Wind Energy Project).

Looking Ahead

Student opportunities to promote and further sustainability issues at Stanford will continue in the year ahead. The Office of Sustainability will continue to improve upon the **Student Green Fund** program and its offerings. Five years of data show that students, when given the proper resources, can develop strong and meaningful projects. To provide more support and resources for student success, the fund will be redeveloped to include more academic and staff advising.

Sustainability student groups continue to expand their membership and offerings. In 2013-14, **Engineers for a Sustainable World** (ESW) plans to expand its local initiatives program by further developing a curriculum that can be used in many high schools in the area to get kids excited about engineering and to expose them to relevant sustainability topics. On a larger scale, in collaboration with Wells for India (a UK-based charity) and Sahyog Sansthan (a local nongovernmental organization), ESW-Stanford will continue to design and improve a solar irrigation system suitable for poor smallholder farmers in India. Having collaborated to bring Al Gore to campus this past year, **Students for a Sustainable Stanford** looks forward to increasing the profile of sustainability issues through helping to organize this year's Stephen Schneider Memorial Lecture. SSS aims to continue to empower its members towards personal growth as well as to make a difference both on campus and beyond. The **Stanford Food Project** plans to continue to raise awareness about food-related issues with events like Food Day, quarterly Eat-ins and the "Farm to Fork" series. The group hopes to support local farmers and food activist organizations through community service, campaigns and other events.

The core of the Stanford community, students will continue to drive sustainability achievement and outcomes across campus in the year ahead.

Related Snapshot Stories:

- Students Host Clothing Swap as Launch for Closetloop Website
- Solar Decathlon Team Begins Construction, Gains National Attention
- Water and Energy Wars Get Serious
- Stanford Energy Club Lays Out Energy Week
- Green Grid Radio Invited to Clinton Global Initiative University
- re.source Wins "Best Overall Solution" at WEST Summit
- eARThbeat Event Showcases Interactive Art and Sustainability
- Green Fund Wraps Up Fifth Successful Year
- Earth Systems Hosts annual Art + Science Exhibition
- Solar Car Project Unveils Luminos

More Information:

http://www.stanford.edu/dept/undergrad/sues/

http://sustainable.stanford.edu/students

http://environment.stanford.edu/cgi-bin/student_groups.php

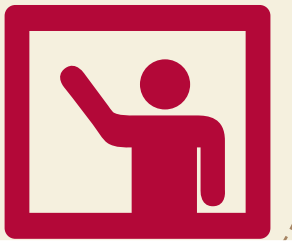
Office of Sustainability Programs

Introduction

The Office of Sustainability (OOS) serves as the hub of Stanford's sustainability programs (dubbed "Sustainable Stanford"). Rooted in operations, the office connects various organizations and entities and works collaboratively with them to steer key sustainability initiatives on campus. Complementing academic curricula led by faculty and operational efficiency measures undertaken by by facilities staff, OOS creates action-oriented programs that make sustainability both tangible and visible at Stanford. In addition to promoting a culture of sustainability through outreach and behavior programs on campus, the office works directly with operational and academic leadership to incorporate sustainability thinking into planning for the university. In a unique position to articulate sustainability initiatives across all campus stakeholder groups, OOS places priority on implementing sustainability efforts not only across campus, but also communicating them to external groups, peer institutions and rating entities.

In the section ahead, we highlight programmatic developments and achievements from this academic year, provide a glimpse of initiatives that lie ahead and outline how our collaborative governance – the engine for all our programmatic areas – works.

Office of Sustainabilty Programs & Services



TRAINING & EDUCATION

ASSESSMENT & EVALUATION

BEHAVIOR-BASED PROGRAMS

Background

Formed in 2008, Stanford's OOS works in six key programmatic areas: evaluations and reporting, infrastructural planning support, campus communications, behavior-based conservation programs, training and education and collaborative governance.

In its first few years, the office focused on institutionalizing sustainability through conservation and communication programs and services. In academic year 2012-13, it has focused on expanding program adoption and creating new assessment programs to strengthen the foundation for a pervasive culture of sustainability. Below, we provide an overview of five of the office's key programmatic areas, as well as updates on program results from 2012-13. The article following this one addresses collaborative governance.

1. Evaluations and Reporting

OOS tracks key performance indicators related to campus resource use and trends. This evaluation is critical to assessing Stanford's success in advancing the sustainability of both its physical campus and its programmatic and academic offerings. The following overview provides background and results for the key elements of the OOS evaluations and assessment program:

Building performance: OOS has worked closely with buildings and facilities staff to determine the best path toward a uniform and complete rating system through which Stanford can assess and benchmark sustainability performance and progress.

- In 2012-13, OOS developed a **campus-wide existing building rating system**. The system uses the LEED for Existing Buildings: Operations and Maintenance (EBOM) rating system as a foundation, complemented by collaboratively developed Stanford-specific criteria that create a more complete story of building performance on campus. An initial pilot of the new rating system highlighted opportunities to further refine it through streamlined data collection and automation and underscored the opportunity for action.
- In conjunction with the development of the existing building rating system, OOS and its Land, Buildings & Real Estate (LBRE) partners completed a **campus-wide LEED-EBOM equivalency analysis** to confirm that all buildings on the Stanford campus are LEED-EBOM-certified equivalent, with many equivalent to the Silver or Gold rating level.
- The yearlong Y2E2 LEED-EBOM certification project, initiated by Stanford Woods Institute faculty and coordinated through OOS, concluded in July 2013. Y2E2 received the **LEED-EBOM Platinum** designation.

Systems integration project: The Department of Sustainability and Energy Management has initiated a systems integration project that will address immediate and long-term information system needs. The Utilities, Metering, Billing, Reporting & Sustainability (UMBRS) project is expected to come online in 2014-15. UMBRS will directly support the creation of building rating and school-level sustainability report cards via sustainability metrics, as well as populating informative building dashboards.

Third-party evaluations: OOS regularly participates in various annual third-party sustainability evaluations. Its 2012-13 results in this area include the following:

- **Princeton Review's** "Guide to Green Colleges" featured Stanford on its **honor roll** in 2013 – the university earned 99 out of 99 points on the annual national survey.
- ***Sierra* magazine's "Cool Schools"** ranked **Stanford in the top 10** for the fourth consecutive year.
- In early 2012 OOS collated and submitted data for the Association for the Advancement of Sustainability in Higher Education (AASHE)'s Sustainability Tracking, Assessment and Rating System (STARS) evaluation. This academic year Stanford achieved the **Gold rating for overall sustainability performance**, the highest level awarded to date.

2. Outreach Campaigns

Individual awareness and actions conserve resources, lower utility bills and contribute to a campus experience consistent with the university's overall commitment to sustainability. In 2012, campus sustainability practices surveys as well as results from existing programs and campaigns continually improved delivery and adoption of these programs.

The Office of Sustainability provides data and analysis for several third-party evaluations, including The Princeton Review and Sierra *magazine.*

The Sustainable Stanford Internship Program, launched in 2012-13, offers internship opportunities in a variety of sustainability disciplines across campus.

To increase institutional awareness and achieve results, OOS annually launches campus-wide **"Cardinal Green" conservation campaigns** on specific programs led by the office or its partners. Each campaign has a specific program goal, relevant messaging and meaningful incentives to drive conservation and efficiency. The following overview provides background and results for each of the campaigns.

- The **Building Hero Campaign** each fall is supported by the **Building Level Sustainability Program** (BLSP). BLSP is an individual-action-based resource conservation program that offers building audits, comprehensive building evaluation criteria and a tailored list of recommendations to interested schools and departments. BLSP projects to date have resulted in sustained reductions of up to 20% in office building electricity use, with an average payback of just nine months. The Express Rebate Program has now contributed almost $17,000 in annual savings since its inception through the installation of electricity-saving devices like Smart Strips and appliance timers.

  In 2012-13, following the Building Hero campaign, another 14 buildings began participating in BLSP, bringing the total number participating to more than 40 – half of those initially targeted. New "Building Heroes" were recognized for their BLSP leadership and awarded gift cards through a series of raffles.

- **Turn Off for Break** each fall is supported by the **Winter Closure Program**. It targets a two-week shutdown of building heating and ventilation systems, as well as custodial services. This campaign in 2012-13 resulted in 882 metric tons of avoided CO_2 emissions and $250,000 in energy savings for the university. Previously voluntary, winter closure became mandatory in 2003, and the cumulative net energy cost savings since 2001 total $2.75 million.

- The **RecycleMania** campaign is supported by the annual **nationwide contest** and the Stanford Recycling Center. Through a series of online pledges, trainings and communications, Stanford was able to increase awareness of waste reduction best practices and ultimately reduce the amount of waste sent to landfill. In 2012-13, Stanford scored in the top 20 in five of the eight categories in the national RecycleMania competition and achieved its best waste minimization score since first entering the contest seven years ago (meaning its lowest number of landfill tons per person).
- **Energy and Water Wars** is supported by the student leadership groups **Green Living Council (GLC)** and **CALPIRG Energy Service Corps**. OOS and R&DE partnered with these student groups to support their efforts and drive conservation in dorms. Energy Wars and Water Wars, two separate but complementary contests, served as Stanford's entry in Campus Conservation Nationals, a nationwide college and university competition to conserve electricity and water. Led by GLC and Energy Service Corps, Energy and Water Wars resulted in a 15.2% reduction in energy use and a 6% reduction in water use at participating dorms.
- **Give & Go** is supported by **R&DE sustainability programs**. In 2012-13, R&DE partnered with OOS and Stanford Recycling Center to put on the most successful move-out donation program to date – the Give & Go campaign. Over 2,000 student donations were collected as students moved out of their dorms after finals to begin their summer recess. The campaign diverted almost 50 tons of donations, including clothing, food, appliances, furniture and books. Fifty volunteers and workers from our partner organizations helped to save resources and provide for the local community, and financial savings are estimated to be over $10,000 in labor costs.

As the Cardinal Green campaign series continues to evolve, the office will incorporate findings from the latest research and best practices in promoting behavior change, drawing on current academic, operational and student work across campus.

3. Sustainability Training and Education

Creating a culture of sustainability on campus requires equipping the community with the tools and information necessary to empower individual change. OOS interacts with faculty, staff and students to design and implement training and engagement opportunities so that hands-on experience in sustainability is integrated into not only the students' overall learning experience at Stanford, but also professional opportunities for campus staff. The following are the key elements of the sustainability training and education programs portfolio.

In the 2013 RecycleMania competition, Stanford achieved its best waste minimization score to-date.

The Sustainable Stanford training program was launched in 2012 and provides hands-on learning opportunities to staff and faculty.

Student Training and Education

- **Student Green Fund:** Having completed its fifth year, the Student Green Fund continues to foster student engagement by encouraging leadership in sustainable improvement projects on campus. The 2012-13 fund awarded almost $30,000 in grants to projects addressing sustainable food education, an app to report water leaks, the use of solar charging stations to build awareness and provide power on the go and student housing water and energy conservation. Highlights from this year's projects are detailed in the Student Leadership and Activities article of this report and online in the 2012-13 Green Fund report. Past projects also continue to benefit campus sustainability.
- **Student internships:** Each year, OOS has worked with sustainability partners across campus to provide internship opportunities for students. In 2012-13, the office and its partners formalized and launched the cross-departmental Sustainable Stanford Internship Program. Sustainable Stanford interns work on projects covering various campus sustainability topics (waste, water, housing, food), under supervision and direction from campus sustainability staff.

Staff Training and Education

Sustainable Stanford training series: Delivering formal training to the Stanford community was one of the key actions identified through the Sustainability 3.0 strategic planning process completed last year. Focused on sustainable behavior and choices, the Sustainable Stanford training series will provide a portfolio of training opportunities in the years ahead.

- Launched in autumn 2012 and available through AXESS, the inaugural course module, *Sustainable Office Spaces* (SST 1000), reviewed the BLSP and actions that support the ongoing Building Hero campaign.
- *How to 5R: Best Practices in Waste Reduction* (SST 2000) was the second installment of the new series. Launched in winter 2013, this course provided a hands-on exploration of waste reduction and management processes and measures at Stanford.

4. Communications and Events

A campus culture of sustainability cannot be created without widespread awareness of Stanford's sustainability plans, programs and achievements. OOS works to promote existing sustainability programs and to publicize campus-wide sustainability actions through a variety of communication and publication channels. The following are the key elements of the outreach programs portfolio.

Publications

- **Sustainability at Stanford Annual Report:** Since 2008, OOS has published this annual document highlighting sustainability achievements from the past year. Representing a campus-wide effort incorporating sustainability milestones and achievements from operational, academic and student partners, the report continues to be the office's flagship publication and an invaluable resource to the sustainability community at Stanford.
- **Sustainable Stanford website:** The Sustainable Stanford website provides a single source of information on sustainability work across campus. The website includes extensive information on campus metrics, trends and initiatives, as well as details on how individuals can get involved. A virtual, self-guided sustainability tour of campus was made available online in 2013.
- **Stanford Energy System Innovations (SESI) Report and portal:** The office publishes documentation and reporting supporting the SESI program and maintains the portal content.
- **Cardinal Green Newsletter:** As part of its new outreach efforts, OOS launched an electronic newsletter in 2013. Now sent as an HTML email on a monthly basis, the Cardinal Green eNewsletter aims to make broadly available a digestible, current update on all things sustainability.
- **Student's Guide to Sustainable Living at Stanford:** This student guide is distributed electronically to the incoming class each year. OOS has offered this resource to incoming students since 2008 and in 2013 supported R&DE student housing with content for the latest production.

The Student Green Fund fosters student engagement and provides funding and guidance for campus sustainability initiatives like the Solar Charging Station project from 2012-13.

The annual "Keys to Sustainability" event is designed to introduce students to the array of sustainability courses, programs, groups and offerings across campus. This year's event was attended by more than 500 students."

Campus Events

- **Celebrating Sustainability annual event:** On Earth Day, OOS hosted Celebrating Sustainability, jointly sponsored by academic and operational entities. This year's event was an interactive festival designed to educate members of the campus community about Stanford's sustainability achievements through fun, engaging activities and displays. More than 35 campus departments, groups and entities, over 60 presenters and more than 20 volunteers hosted this 1,000+ person event at the Science and Engineering Quad.
- **Keys to Sustainability at Stanford student reception:** This annual reception served as an opportunity to educate students about the variety of sustainability offerings in research, academics and extracurricular activities. With about 500 students attending, the event was designed to inspire students to explore environmental sustainability issues.

OOS also regularly engages in on- and off-campus community outreach, programs and events. Staff participate in approximately 70 outreach opportunities every year, including conferences, presentations, tours, tabling and other activities. All campus communications and publications on sustainability are heavily influenced by and consciously integrated with OOS's academic partners in the School of Earth Sciences, the Stanford Woods Institute for the Environment, the Precourt Institute for Energy, the Haas Center for Public Service and their affiliates.

The Office of Sustainability hosts the annual "Celebrating Sustainability" event. This year's event was attended by more than 1,000 students, faculty and staff.

Stanford was ranked among the top 10 "Coolest Schools" by Sierra *magazine in 2013 and made the Princeton Review's Green Honor Roll, scoring the highest possible score.*

5. Infrastructural Planning Support

As the programmatic arm of operational sustainability efforts at Stanford, OOS works within Sustainability & Energy Management (SEM) and along with various campus operation units and academic groups to help support the development of long-term plans to improve campus operations and infrastructure. The following are the key elements and 2012-13 results of these activities:

Greenhouse gas (GHG) emissions inventory: Completing an emissions inventory is the first step in developing an effective energy and climate plan. Stanford GHG emissions (Scope I, II, and III plus emissions due to steam and chilled water supplied to Stanford Hospital & Clinics) totaled approximately 270,400 metric tons of CO_2 in 2012. Since 2006, Stanford has prepared and filed independently verified emissions inventories for its Scope I and II emissions. Emissions have remained relatively flat for a number of years but will significantly decrease in coming years as a result of the SESI program.

SESI support: In 2012-13 OOS provided consistent support in departmental outreach and presentations for the SESI program across campus. The program is now in full implementation mode, and the office is working alongside SEM and the Department of Project Management to keep the campus and surrounding community informed. In 2012-13, the office continued to support SESI outreach to campus by authoring, updating and maintaining informational materials and the SESI website and by providing presentations, tours, information and a live-feed webcam of the central energy facility construction site.

Looking Ahead

The Office of Sustainability has evolved significantly since it was founded in 2008. Moving forward, the office will continue its current programs and support new and additional programs.

Building on the successful pilot rating of campus office/classroom buildings in 2012-13, OOS will work to further refine the internal building rating system, tailor the balanced scorecard for all building types and roll out the system through additional pilots. When completed, OOS will proactively deliver schools and departments an annual **sustainability report card** on a wide variety of sustainability topics, from energy use to behavior-based program participation. Grades can be improved not just through participation in efficiency programs, but also through better occupant engagement and conservation. The first version of the report card is expected to go live in fall 2014.

OOS will soon embark on a campus-wide targeted equipment inventory to **quantify plug load consumption** and facilitate program development for a range of campus stakeholders. The project will include a room-by-room physical inventory to collect data on electricity-consuming equipment and will ultimately reveal systemic opportunities for campus-wide efficiency measures.

Working together with academic entities, the office looks forward to providing additional opportunities for practical **training and education** to the Stanford community. Plans for 2013-14 include expanding Sustainable Stanford training modules for staff and providing actionable, results-driven internship opportunities for students through the new Sustainable Stanford Internship Program. Each intern will commit to a yearlong academic program working to manage a campus sustainability project and bring about tangible results. In addition to gaining experience in sustainability project design and implementation, interns will learn about the variety of careers in sustainability across campus as well as develop a network of cohorts.

OOS and the Stanford Woods Institute offer **Civil and Environmental Engineering / Earth Systems 109** in winter quarter. After a sabbatical to improve its efficiency, the course will return in winter 2014. CEE/ES 109 aims to engage students in employing practical sustainability measures within an institution.

In the year ahead, the office expects to continue all of its communications and publications. Future communications will look to strengthen existing engagement campaigns through programs, incentives and promotion. A 2013-14 priority project for OOS is the design and development of a **sustainability portal**. Envisioned as a hub of engagement in sustainability initiatives at Stanford, the portal will incorporate various tools and resources to provide an engaging and inspiring platform for sustainability action on campus.

Related Snapshot Stories:

- Sustainability Remains a Hallmark of New Student Orientation
- Student Reception Draws Hundreds to Sustainability Opportunities
- First Sustainable Stanford Training Course Launched
- Building Hero Campaign Drives Individual Energy Savings
- Sixth Annual Campus GHG Emissions Inventory Verified
- Building Level Sustainability Program Celebrates Five-Year Anniversary with Record Participation
- "Celebrating Sustainability" Urges Individual Action on Earth Day
- Winter Closure Campaign Saves Energy
- Stanford Reduces Waste During RecycleMania Competition
- Green Fund Wraps Up Fifth Successful Year
- Stanford's Y2E2 Building Achieves Platinum Grade
- Office of Sustainability Launches Self-Guided Sustainability Tour
- Stanford Awarded Highest Green Rating by Princeton Review
- Stanford Ranks in Top Ten *Sierra* "Cool Schools" for Fourth Year in a Row

More Information:

http://sustainable.stanford.edu

http://sesi.stanford.edu

Collaborative Governance at the Core

A core value such as sustainability is best integrated through collaborative governance, especially in a large institution like Stanford. Through strategic partnerships among administrative departments, faculty and students, sustainability is embedded as a value-add supporting Stanford's mission of education, research and outreach.

In 2011-12, a group of faculty, staff and student leaders initiated Sustainability 3.0, a strategic blueprint for the future of sustainability at Stanford. The Sustainability 3.0 process sought to identify and map a shared and actionable vision for sustainability at Stanford over the next five to ten years, building on the Initiative on the Environment and Sustainability (2003) and the formalization of Sustainable Stanford (2007). Major goals stemming from this effort include leading sustainability by example through on- and off-campus actions and maintaining a global influence through sustainability in research, education and operations.

With these goals in mind, the following three active parts of collaborative governance support the continuation and refinement of sustainability programs.

Provost's Committee on Sustainability

To ensure that sustainability is a top and lasting priority for Stanford University in research, teaching and action, the provost approved a new Provost's Committee on Sustainability with senior leadership representatives from each stakeholder area across the university. The committee was launched in spring 2012, with the intention of bringing key leaders on campus together to focus on sustainability

at Stanford. Chaired by the dean of the School of Earth Sciences, the committee meets quarterly. Its mission is to:

- Overcome institutional barriers, which, for cross-functional projects, may be processes, people or resources;
- Give advice to the Sustainability Working Group (SWG), which is managed by OOS, and other action groups on how to proceed on strategic programs; and
- Inform and engage the president and provost, bringing campus-wide sustainability issues to their attention and informing, advising and conversing with them on new initiatives.

In 2012-13, the committee met three times. The results of its leadership and guidance include the following:

- The Celebrating Sustainability Festival on April 22, which had 1,000 attendees, 35 partners and 60 presenters
- A proposed campus-wide Cardinal Green Program with targeted outreach campaigns, employee training and participation incentives
- The initial outline of an academic program leading to a sustainability notation
- Identification of opportunities in greening Department of Athletics operations
- Commencement of the life cycle carbon assessment of Stanford Procurement
- General improvement in communication and prioritization of sustainability programs due to committee attention and endorsement

Sustainability Working Group

The SWG helps review and support program development to advance and implement sustainability practices on campus. Chaired by the director of OOS and comprising representatives from all parts of the university, including faculty, staff and students, the SWG meets monthly. Its mission is to:

- Continuously improve Stanford's leadership in demonstrating environmental sustainability in campus operations;
- Incorporate faculty, staff and student expertise in the evolving field of sustainability to enhance program development; and
- Advance opportunities for hands-on sustainability-related learning and service in the campus community.

In 2013-13, the SWG gathered nine times, conducting major programmatic reviews and identifying coordination points. Frequent topics included sustainability assessment programs, behavioral initiatives, the status of the SESI program and various new initiatives that thrive on interdepartmental coordination and support.

The annual "Celebrating Sustainability" event is hosted by OOS as a key deliverable of the Provost's Committee on Sustainability.

The Provost's Committee on Sustainability was launched in 2012 to bring key campus leaders together to focus on sustainability as a core value at Stanford.

Sustainability Working Teams

The Sustainability Working Teams assembled in 2008 to develop program recommendations, assess progress and help implement policy recommendations in major operational areas related to sustainability. Each team activates when a specific initiative is under way and may be dormant once a project is in implementation or has been implemented. In 2012-13, the active working teams were in the areas of water, food and dining and zero waste.

OOS programs benefit from the guidance of the SWG as well as the Provost's Committee on Sustainability. The office staffs both committees to directly address content creation and information dissemination. Collaborative governance by faculty, staff and students works and serves as the engine for all the programmatic areas.

More Information:

http://sustainablestanford.stanford.edu/governance

http://sustainable.stanford.edu/swg_agendas

AWARDS AND RECOGNITION

Awards and Recognition, 2012–2013

Stanford's long history of sustainability-focused operations and academic research has been recognized by regional, national and international organizations. The spectrum of Stanford's awards and commendations spans a wide range of topics, highlighting the multifaceted nature of sustainability. Presented below are some of the most significant formal recognitions of campus sustainability initiatives.

Third-Party Evaluations of Sustainable Stanford

2014 Green Honor Roll, Princeton Review: Stanford was named one of the 22 most environmentally friendly colleges and universities in the nation, earning 99 points—the highest possible score—in a survey of 832 schools.

***Sierra* Magazine's Cool Schools:** Stanford ranked in the top 10 for the fourth consecutive year.

Gold Rating, Association for the Advancement of Sustainability in Higher Education (AASHE): Stanford maintained a Gold rating under the first comprehensive sustainability performance assessment and national rating system. This is the highest rating level awarded by AASHE to date.

Operations

LEED for Existing Buildings: Operations & Maintenance Platinum Certification: The Jerry Yang and Akiko Yamazaki Environment and Energy Building (Y2E2), the first large-scale high-performance building at Stanford, received the highest rating awarded by the U.S. Green Building Council (USGBC). (2013)

LEED for New Construction Platinum Certification: The Knight Management Center, home to the Graduate School of Business, received the highest rating awarded by the USGBC. (2012)

Effective and Innovative Practices Award, APPA: APPA, the largest international association of educational institutions and their facilities and physical plant departments, recognized the Stanford Energy System Innovations

program for the innovative design of the new heat recovery system and central energy facility at Stanford. (2013)

Gold Award, Best Workplaces for Commuters, Stanford's Transportation Demand Management program. Stanford was one of 23 employers nationwide recognized in the organization's Race to Excellence.

Finalist, Green Enterprise IT Awards: The Uptime Institute honored Stanford's case study featuring server consolidation at the Clark Center, one of the top five energy-consuming buildings on campus. The Clark Center IT group was able to relocate servers from the building, where research space is at a premium, to a new centralized data center, where servers can operate at much higher efficiencies.

RecycleMania Results: Stanford scored in the top 20 in five of the eight categories: Gorilla (7th), paper (17th), cardboard (20th), bottles and cans (17th) and food waste (17th). (2013)

Research & Academics

Best Paper in Geophysics Award, Society of Exploration Geophysicists, Mark McClure/Roland Horne, for the technical paper entitled Investigation of injection-induced seismicity using a coupled fluid flow and rate/state friction model (2012)

Cox Medal for Faculty Excellence Fostering Undergraduate Research, Kate Maher. The medal was established in memory of the late Allan V. Cox, a former professor of geophysics and dean of the School of Earth Sciences, who was a strong supporter of faculty-student research collaboration. (2012)

Early Career Award, DOE Office of Science, Dao Xiang, for his work on a technique known as external seeding for improving the function of X-ray free electron lasers, and Leonardo Senatore, for his work on applying particle physics techniques to answer questions in cosmology (2012)

Greenman Award, Sally Benson, for her vital contributions towards progressing carbon capture and storage technologies and enhancing international understanding of the process of mitigating greenhouse gas emissions (2012)

Ian Campbell Medal, Gordon Brown, for pioneering the use of synchrotron radiation in Earth sciences. He was also recognized for his contributions as an educator, administrator and public servant. (2012)

Melvin P. Klein Scientific Development Award, Tim Miller, for his leadership and ingenuity in establishing a new type of experimental capability that enables ultrafast X-ray experiments at the Stanford Synchrotron Radiation Lightsource (2012)

Robert R. Wilson Prize, John Galayda, for his leadership and outstanding and pioneering contributions to the development, construction and commissioning

of the Linac Coherent Light Source and his contributions to the construction of the Advanced Photon Source and the National Synchrotron Light Source (2012)

Top Young Innovator, MIT Technology Review, William Chueh, for developing a technology using heat that is otherwise wasted to boost the efficiency of solar fuel production (2012)

Ecological Society of America's Sustainability Science Award, Pamela Matson, for *Seeds of Sustainability: Lessons from the Birthplace of the Green Revolution*. The award recognizes the authors of the peer-reviewed paper published in the past five years that makes the greatest contribution to the emerging science of ecosystem and regional sustainability through the integration of ecological and social sciences. (2013)

Elected to National Academy of Sciences, Greg Asner, of the Carnegie Department of Global Ecology, for his distinguished and continuing achievements in original research (2013)

Louis Néel Medal, Mark Zoback, for his outstanding and seminal contributions to rock physics and geomechanics, in particular for applying geomechanics to solve a wide range of problems of scientific, engineering and economic importance (2013)

Max Planck Research Prize, Chris Field, for having significantly increased our knowledge of how life on Earth responds to climate change, and what reactions can be anticipated between the biosphere and the atmosphere (2013)

Michel Boudart Award for the Advancement of Catalysis, Jens Nørskov, for his pioneering work on understanding trends in catalyst activity and developing catalyst design principles based on reactivity descriptors (2013)

National Academy of Sciences Advisory Group for Gulf of Mexico Program: Chris Field and Mark Zoback are among 24 advisors chosen for the program, which focuses on human health, environmental safety and oil system safety for the area. Zoback served on the committee investigating the Deepwater Horizon event, while Field is a member of the National Academy of Sciences. (2013)

National Medal of Science, Sidney Drell, for contributions to quantum field theory and quantum chromodynamics, application of science to inform national policies in security and intelligence, and distinguished contributions as an advisor to the U.S. government (2013)

Schmidt-MacArthur Fellowship, Ernestine Fu and Martin Fischer, for their research on circular economy, a generic term for an industrial economy that is, by design or intention, restorative and in which materials flows are of two types: biological nutrients, designed to reenter the biosphere safely, and technical nutrients, designed to circulate at high quality without entering the biosphere (2013)

SNAPSHOTS 2012–2013

Introduction to Snapshot Stories

The chronological snapshot stories that follow not only provide details on many of the featured topics, they also underscore the steady pulse of sustainability on campus. Some initiatives are bold and ambitious, while others are grassroots. Some programs are intended for long-term implementation, while others concluded this year. However, all are strategic and collaborative parts of Stanford's integrated and flourishing culture of sustainability.

Undergraduate Program Engages Students in Sustainability Issues

Since 1995, the Stanford undergraduate program's Sophomore College (SoCo) has offered students the opportunity to study intensively in the weeks before the start of fall quarter in an enhanced seminar environment. Many SoCo courses involve field trips and opportunities for hands-on learning. This year's SoCo included a number of courses on environmental and sustainability topics. In Energizing a Sustainable Future, students explored energy markets, technologies and policies, spending part of their time in Washington, D.C. In Environmental and Geological Field Studies in the Rocky Mountains, students explored the geologic history of the Rocky Mountain region and environmental challenges posed by climate change and land use patterns. In People, Land, and Water in the Heart of the West, students embarked upon a two-week field course in Idaho exploring working landscapes, public and private lands, water and fisheries, conservation issues, and the relationship between people and the land in the American West. These courses give students the opportunity to investigate environmental topics in depth without the distractions of the regular academic year. With their steady popularity, SoCo courses will be offered for years to come.

More Information:

http://soco.stanford.edu

SPOT Farming Program Exposes Incoming Students to Food and Farming Issues

Stanford Pre-Orientation Trips (SPOT), run by Stanford Outdoor Education, are five-day wilderness or service-learning experiences for incoming freshmen during the week before New Student Orientation. The trips allow students to make new friends and transition into college life. Three years ago, motivated by student interest, SPOT began offering Sustainable Farming trips in partnership with the Stanford Food Project and the Stanford Educational Farm Program. During these experiences, students spend five days living, working and learning at local educational farms. Activities include harvesting, weeding, cooking, tending livestock and hiking. In 2012 SPOT ran four trips for approximately 40 freshmen and 9 student leaders to Pie Ranch (Pescadero), Hidden Villa (Los Altos Hills), Live Earth Farm (Watsonville) and Foggy River Farm (Healdsburg). The program exposes students to problems and solutions within our food systems and allows many students from urban and suburban areas to experience where their food comes from, often for the first time. Sustainable Farming trips have now become a regular option for SPOT excursions and will continue to be offered in the year ahead.

More Information:

http://outdoored.stanford.edu/spot/farming/

Incoming Graduate Students Explore Energy@Stanford & SLAC

Some 110 Stanford graduate students attracted to the study of energy interacted with each other and leading scholars at the annual Energy@Stanford & SLAC conference. Held before the start of fall term, the weeklong event introduced students to the array of energy research and education opportunities both on campus and at SLAC National Accelerator Laboratory. More than 30 researchers in fields from solar power to energy efficiency and from fuel cells to energy policy spoke about their disciplines, specific studies and classes. MBA candidates networked with engineering students, and faculty met potential research assistants. Students heard from entrepreneurs and visited nearby cleantech companies, as well as SLAC and Jasper Ridge Biological Preserve. Student teams devised real-world solutions to climate change in a strategy competition using technical software, economic knowledge and political savvy.

The event also featured Sustainable Stanford's programs and high-performance building tours, demonstrating the value of the university as a living laboratory right from the start of students' experience at Stanford. The conference is part of the Stanford Graduate Summer Institute. It is sponsored by Stanford's vice provost for graduate education, the Precourt Institute for Energy, the Stanford Institute for Materials & Energy Sciences, the Global Climate & Energy Project, SLAC National Accelerator Laboratory and the National Renewable Energy Laboratory.

More Information:

http://stanford.io/14Q9jpq

INTERDISCIPLINARY RESEARCH

Faculty Awarded Millions for Innovative Energy Research

Stanford's Precourt Institute for Energy (PIE), TomKat Center for Sustainable Energy, and Precourt Energy Efficiency Center awarded nine faculty a total of $2.2 million for promising new research in clean-energy technology, energy efficiency and economics. The seed funding typically supports two years of early work on concepts that have the potential for very high impact on energy production and use. "We looked for projects where the investigators had moved into new areas of energy research for which the potential payoffs justified taking the risk associated with early-stage proposals," said PIE Director Lynn Orr, a professor of energy resources engineering and member of the selection committee.

The funded projects include studies to advance technologies like high-performance batteries and solar cells, improve manufacturing processes, make renewable technologies more affordable, and offer scalable solutions to advance renewable power and sustainable vehicles. A study on barriers to energy-saving technologies in the building industry has already led to follow-on work with Johnson Controls' energy efficiency division.

More Information:

http://stanford.io/1et0bwr

COMMUNICATIONS & OUTREACH

Sustainability Remains a Hallmark of New Student Orientation

Before arriving at Stanford, all incoming students receive digital copies of the *Student's Guide to Sustainability on the Farm from Undergraduate Education*, along with a letter about Stanford's commitment to sustainability. This year, Sustainable Stanford furthered this strong tradition of introducing sustainability to new students through its presence at New Student Orientation, with a goal of educating students on the range of sustainability opportunities available on campus. The group spoke to hundreds of students at multiple events, including, for the first time, the Zero-Waste Lunch – an event that allowed students to enjoy sustainable food in compostable containers while learning about Stanford's waste system and zero-waste efforts. Copies of publications – *Sustainability at Stanford: A Year in Review* and "The Tree's Pocket Guide to a Sustainable Stanford" – were available for interested students at all events. Hot-ticket items this year were the biodegradable basil-growing kits, especially popular among new graduate students looking to grow their own herbs. Sustainable Stanford will continue to maintain and strengthen the availability of resources for incoming students and educate them about Stanford's culture of sustainability.

More Information:

http://sustainable.stanford.edu/students

WASTE MINIMIZATION

Department of Chemistry Partners with EH&S to Reuse Lab Waste

In September, Environmental Health and Safety (EH&S) partnered with the Department of Chemistry to minimize the amount of hazardous and nonhazardous waste generated from a lab space that had recently been vacated. The occupants removed the items they wanted and then turned the space over to EH&S for cleanup. EH&S recycled nearly two cubic yards of cardboard and paper, half a cubic yard of recyclable plastic items such as pipette trays and tip holders, and additional amounts of metal and wood. Many lab items, such as desks and chairs, a refrigerator and a storage cabinet for flammables, were redistributed to other interested labs. In addition, E&HS and the Department of Chemistry were able to redistribute nearly 1,000 surplus chemical items to other groups for reuse, instead of letting them go to waste. “While lab cleanouts are rather routine work for EH&S, this one was a great example of teamwork between an academic department and a staff function leading to a more environmentally responsible outcome,” commented Craig Barney, manager of environmental programs for EH&S. Examples like this show the many ways groups across Stanford are partnering to make the university more sustainable.

More Information:

http://stanford.io/18aMr4z

CLIMATE & ENERGY

SESI Progress Earns Local Recognition

With the implementation of the Stanford Energy System Innovations (SESI) program now under way, industry leaders are beginning to take notice of the progress being made to transform the university’s utility system. This fall, the Silicon Valley Business Journal published a feature on Joe Stagner, executive director of the Department of Sustainability & Energy Management (SEM), to discuss Stanford’s SESI program. The interview, published in the September 14 edition of the journal, highlighted Stanford’s efforts to reduce the campus environmental footprint through programs that include SESI and other energy initiatives. The journal noted that Stanford “pays more than just lip service to green living” and highlighted the university’s many partnerships that have made such sustainability initiatives possible. Stanford was honored to have also been named a finalist in the Acterra Business Environmental Leadership Awards. As part of the awards judging process, SEM welcomed a panel of local business leaders to campus for a tour of campus operations and an overview of SESI and other sustainability programs at Stanford.

More Information:

http://bit.ly/1e94r1E

http://bit.ly/1eNSa5r

FOOD AND HOUSING

R&DE Continues Commitment to Local Foods with Organic Salad Greens Mix

Residential & Dining Enterprises (R&DE) continued to expand its sustainable food commitments this year by adding organic salad greens mix to its purchasing plan. Local, organic and fair food now makes up about 40% of R&DE Stanford Dining's total food purchases.

Stanford Dining chose Earthbound Farms to provide an organic, seasonal and local salad greens mix. Earthbound Farms offers a high-quality product that tastes great, and it also employs the most stringent food safety mechanisms in the industry. Earthbound Farms tests and holds all greens to ensure they are free of deadly pathogens; allows customers to trace all salad greens; and employs optical sorters that remove pebbles, twigs and other foreign materials that could find their way into the salad greens. R&DE Stanford Dining's staff, including chefs, purchasers, the sustainability manager and dining hall managers, visited Earthbound Farms in the spring to see it in action. Earthbound Farms took the staff on a tour of the fields, let them taste a variety of products and discussed both sustainability and food safety in detail.

More Information:

http://stanford.io/16GPxta

http://www.ebfarm.com/

COMMUNICATIONS & OUTREACH

Student Reception Draws Hundreds to Sustainability Opportunities

Nearly 300 students joined the Office of Sustainability and partners at a sustainability welcome reception and open house on October 18 in Old Union Courtyard. The event was designed to inspire students to explore environmental sustainability issues by featuring the ways in which they could participate through both academic pursuits and campus action. Students who attended were provided information on relevant student groups, majors, courses, off-campus programs and funding opportunities. The event served as an opportunity for the many sustainability groups and programs on campus to converge, share knowledge and celebrate the thriving culture of sustainability at Stanford. Keynote speaker Julie Kennedy, codirector of the Earth Systems Program and Haas Center for Public Service, encouraged students to find ways to explore their passion for sustainability in whatever department or program they chose. This annual event will continue to equip incoming students with the resources and tools to enjoy and actively participate in the growing sustainability scene at Stanford.

More Information:

http://ssu/welcome_reception

Earth Systems Announces New Food and Agriculture Track

This fall, the Earth Systems Program announced a new option under the Land Systems and Land Use track. The Sustainable Food and Agriculture option focuses on both local and global food and agricultural systems. As part of this academic track, students can gain a breadth of knowledge on these issues through courses in aquaculture, food and society, climate and agriculture, the science of soils and world food economy. The Sustainable Food and Agriculture track also features a field study course, with the current options being *Food and Community* and *Principles and Practices of Sustainable Agriculture*. With Earth Systems majors and prospective majors already expressing a great deal of interest, course offerings for this track will continue to expand in the years ahead.

More Information:

http://stanford.io/19kGEHw

GCEP Celebrates 10th Anniversary at Annual Symposium

In 2012, the Global Climate and Energy Project (GCEP) celebrated its 10th anniversary. Motivated by the need to provide affordable and secure energy with low greenhouse gas emissions to a growing global population, ExxonMobil, GE, Toyota and Schlumberger joined with Stanford in 2002 to create this project. GCEP's goal is to support fundamental scientific and engineering research to underpin a new generation of energy technologies. This year, DuPont joined the GCEP partnership, bringing new perspectives and insights about the global energy challenge.

Since its launch, GCEP has supported more than 700 researchers worldwide on a broad range of energy research issues – from all-carbon-based solar cells to microbial methane to wirelessly charged electric vehicles. GCEP highlighted its 10 years of success at the annual GCEP Research Symposium, held October 10-11 at Stanford. The event focused on progress made – and the challenges still ahead – in energy research. As always, GCEP beneficiaries briefed attendees on significant advances in their projects.

More Information:

http://stanford.io/16QJ7c5

Interdisciplinary Team Hosts Third Annual Food Summit

Stanford School of Medicine built on the previous two year's successes to produce Stanford's third annual food summit. This engaging event consisted of morning presentations pairing Stanford faculty and students with their community partners, and an evening public forum and keynote speech. New to the 2012 summit was a showcase featuring 15 Stanford student and community food organizations and 16 student research posters. Summit organizers aimed to develop further links between Stanford's resources and community food groups and provide a forum for building a learning community to improve America's food system. The morning panelists presented case studies of how Stanford is working to improve the food system within the university and in the surrounding community; for example, it is developing a garden-based curriculum for youths 5-14 years old, writing and implementing food policy in Santa Clara County and redefining hospital food. The evening's public forum featured an expert panel addressing the complexities of the U.S. farm bill. The keynote was delivered by celebrated food advocate John Robbins, who discussed lessons learned from his 25 years in the sustainable food movement. The event succeeded in highlighting many important issues America's food system faces and outlining a more sustainable food future.

More Information:

http://foodsummit.stanford.edu/

Stanford Breaks Ground on New Central Energy Facility

Implementation of the Stanford Energy System Innovations (SESI) program is now fully under way. In October, Stanford broke ground on a first-of-its-kind energy facility that will be key to reducing the campus's carbon emissions by 50%, its water use by 18% and its costs by an estimated $300 million over the next 35 years.

The new all-electric central energy facility will allow Stanford to procure electricity from any number of diverse sources, including renewable sources and will be operated by an automated control system invented at Stanford. The new facility will also allow the university to regenerate the waste heat that the cogeneration plant discards. An estimated 70% of the waste heat created by chilling water will now be used to supply 80% of the heating and hot water required for campus buildings. Construction of the facility can be viewed in real time at the SESI website.

Concurrent with construction of the new central energy facility, Sustainability and Energy Management staff are working hard to install over 20 miles of hot water piping across campus while minimizing disruption to the campus community. When fully implemented in 2015, SESI will be one of the most energy-efficient systems at any major research university in the world.

More Information:

http://sesi.stanford.edu

http://stanford.io/1fdKM1P

TRAINING & EDUCATION

First Sustainable Stanford Training Course Launched

The first series of Sustainable Stanford open-enrollment training opportunities focused on sustainable behavior and choices. Launched through AXESS, the inaugural course module, *Sustainable Office Spaces* (SST 1000), reviewed the Building Level Sustainability Program and actions that support the ongoing Be Your Building's Hero campaign. During the October session, 15 staff members convened for hands-on lessons on Smart Strips, timers and light meters. Subsequently, many class participants completed audits of their buildings and have been working to implement identified efficiency measures.

Delivering formal training to the Stanford community in conjunction with conservation campaigns has been an objective of Sustainable Stanford. Please stay tuned for announcements on the launch of future training modules, which may include key green choices at Stanford; green event planning; reuse, recycling and composting programs; laboratory conservation measures and efficiency opportunities; water conservation techniques; how buildings work (building system fundamentals) and many more.

More Information:

http://stanford.io/1beAcVR

ENERGY EFFICIENCY

Case Study on Success of Energy Retrofit Programs Featured

In 2012 Stanford was once again featured in *Greening the Bottom Line*, a publication of the Sustainable Endowments Institute (SEI). The report investigates the prevalence of green revolving funds on campuses across the United States. As highlighted in SEI's report, the Energy Retrofit Program, the Whole Building Retrofit Program, and the Water Conservation Program contributed to Stanford's having one of the largest fund sizes and a significant number of sustainability projects on campus.

Greening the Bottom Line is part of the Billion Dollar Green Challenge, of which Stanford is a founding member and leader. The goal of the challenge is to invest a total of $1 billion in self-managed green funds that finance energy efficiency upgrades on campuses. Participating institutions can reduce their operating expenses and greenhouse gas emissions, while creating regenerating funds for future projects. Stanford's funds have cumulatively invested more than $41 million in energy-related projects on campus to date, with an average payback of less than five years.

More Information:

http://greenbillion.org/resources/#reports

Stanford Energy Club Launches Panel Series with Nuclear Energy Discussion

The Stanford Energy Club hosted its first Energy 360 panel of the year, a discussion on the domestic and international effects of safety issues on policy and future research in nuclear technology. The broad range of perspectives and experiences presented by the panelists provided a multifaceted and thorough discussion of nuclear energy. The event was moderated by Dr. Leonard Weiss from Stanford's Center for International Security and Cooperation, and panelists included a range of industry insiders. At the quarterly Energy 360 events, panelists from a variety of backgrounds come together to discuss an energy topic from several different angles. A social hour with panelists follows every event, so audience members can be sure to get all of their questions answered. Past topics have included energy storage, zero-energy buildings, transportation and shale gas. The Stanford Energy Club, the university's largest student energy organization, brings together Stanford students, scholars and local professionals from all disciplines to generate thought-provoking discussions and facilitate innovations that address some of the world's most complex challenges.

More Information:

http://energyclub.stanford.edu/

Stanford Scientists Help Cut Solar Cell Costs, Expand Uses

This fall, two announcements from the Stanford energy community highlighted the valuable role that Stanford researchers play in advancing clean energy technologies such as the solar cell. The development of the first all-carbon solar cell could have significant implications for manufacturing solar modules. Unlike the rigid silicon solar panels that adorn many rooftops, the thin-film prototype is made of carbon materials that can be coated from solution, enabling manufacturers to produce flexible carbon solar cells that allow new applications and reduce manufacturing costs.

Also working to improve the manufacturing process for solar technology is a group of researchers at SLAC's Stanford Synchrotron Radiation Lightsource (SSRL). In November, SSRL received support from a Department of Energy SunShot Initiative for three research projects that seek cheaper materials and manufacturing techniques. The studies aim to improve an ink jet–like printing technique for producing flexible solar paneling, making thin-film solar panels more efficient and understanding structural changes in solar panel components that are heated during manufacturing.

More Information:

http://stanford.io/1aWR5HO

http://stanford.io/19ifeDf

Stanford Begins Implementation of Habitat Conservation Plan

On November 23, the U.S. Fish and Wildlife Service and the National Oceanic and Atmospheric Administration published the Final Stanford Habitat Conservation Plan (HCP) and Final Environmental Impact Statement. The HCP serves as the next step for the university in receiving approval to begin implementing measures for protected species on campus. HCPs allow landholders to create long-term conservation plans rather than rely on short-term, limited mitigations for specific projects that might affect threatened or endangered species. The university first began developing the HCP more than a decade ago.

The extensive 50-year plan includes permanent conservation easements focusing on habitats of the California tiger salamander, California red-legged frog, and San Francisco garter snake. In addition, the HCP includes the creation of a 315-acre tiger salamander reserve in the lower foothills and allows for continued water supply to Lagunita to support salamander breeding. The plan divides the university's lands into four habitat zones, establishing a comprehensive conservation program for each and outlining how Stanford will monitor the status of protected species. After a lengthy development and approval process, the university is looking forward to taking steps to protect endemic species.

More Information:

http://stanford.io/1aaQsUU

Building Hero Campaign Drives Individual Energy Savings

The second annual Building Hero campaign launched in fall 2012 with the goal of adding 25 buildings to the list of participants in the Building Level Sustainability Program, an ongoing initiative aimed at harnessing individual action to positively impact Stanford's sustainability and bottom line.

In just the first three weeks, representatives from 15 buildings contacted the Office of Sustainability and pledged to participate. In addition to the educational resources and incentives made available in the past, the 2012 Building Hero campaign featured new open-enrollment training (*Sustainable Office Spaces*, SST 1000), streamlined building-specific recommendations, and direct support from Office of Sustainability staff and interns. Program staff also provided "building heroes" with relevant "how to" guides and information on a rebate program (Energy Retrofit Program Express) that can help defray the cost of timer and Smart Strip purchases.

Individual actions complement efficiency improvements and contribute to Stanford's carbon footprint reduction goals. With the help of a growing network of "building heroes," the Office of Sustainability hopes to further reduce Stanford's impact and bottom line moving forward.

More Information:

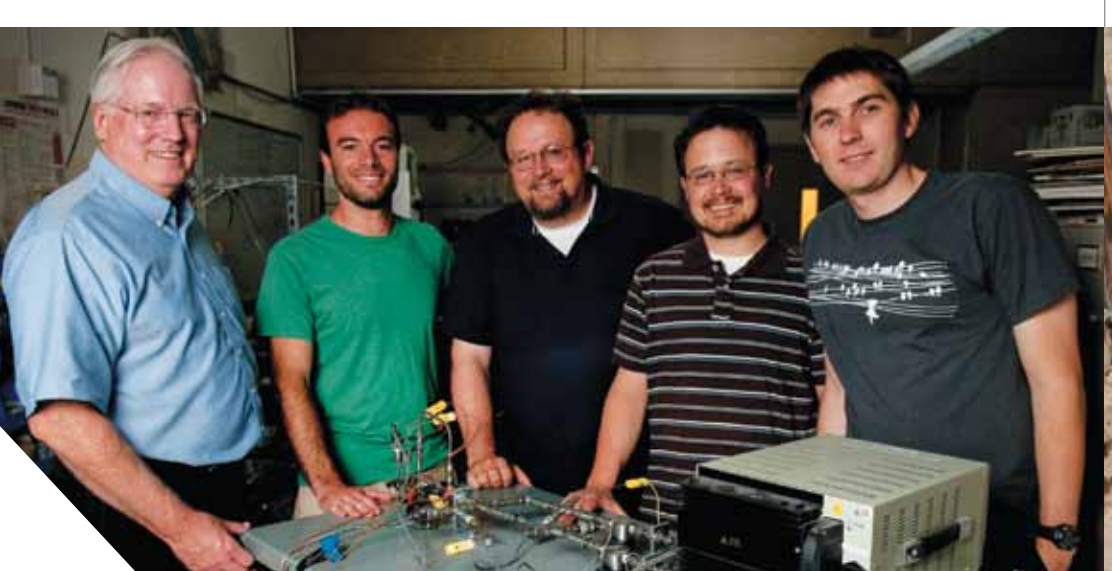
http://stanford.io/18wiNre

Stanford Student Named to Forbes 30 Under 30 List of Rising Stars in the Energy Sector

Yaniv Scherson, mechanical engineering doctoral candidate at Stanford, was named to the second annual *Forbes* 30 Under 30 List of Rising Stars in the Energy Sector for his work on innovative energy systems. Working with Woods Senior Fellow Craig Criddle and aeronautics Professor Brian Cantwell, Scherson invented and installed a system that creates electricity from sewage. Scherson, Criddle and Cantwell began developing the low-cost technology in 2009 with a grant from the Stanford Woods Institute's Environmental Venture Projects initiative. The process recovers energy from waste nitrogen by capturing ammonia from sewage treatment plants and converting it to nitrous oxide. The nitrous oxide can be used to burn biogas, which results from the recovery of methane from organic waste, or to power a small rocket thruster that converts the nitrous into clean, hot air. The technology is an important part of a larger effort at Stanford to develop economical and energy-efficient ways of recovering clean water and other valuable products from wastewater.

More Information:

http://onforb.es/19Ag906



Dhaka Water Project Wins EPA Grant

The U.S. Environmental Protection Agency (EPA) awarded a $15,000 grant and the opportunity to compete for up to $90,000 to a Stanford team advised by Jenna Davis, associate professor of civil and environmental engineering, and Stephen Luby, professor of medicine. The Stanford Dhaka Water Project is developing a device to disinfect drinking water without relying on electricity or moving parts. The in-line chlorinator is designed for low-income urban areas that rely on shared drinking water points and is being tested in Dhaka, Bangladesh. This low-cost technology has the potential to provide safe drinking water to millions.

EPA awarded the grant as part of the first phase of its annual P3: People, Prosperity and the Planet Student Design Competition for Sustainability, focused on developing "sustainable technologies to help protect people's health and the environment while promoting economic development." The Dhaka Water Project team took home the American Society of Civil Engineers Sustainable Development Award at the EPA competition this year.

More Information:

http://stanford.io/19aaH3N

http://stanforddhakawater.wordpress.com/about/

BEHAVIOR-BASED PROGRAMS

Three Dorms Tie for First in Stanford's Bike Safety Dorm Challenge

Every year the Bike Safety Dorm Challenge, sponsored by Parking & Transportation Services (P&TS), encourages undergraduates to bike safely by pledging to follow the rules of the road and to wear a helmet for every ride, even short trips. This year, a record 951 Stanford students from 21 undergraduate residences participated in the third annual challenge from September 18 to December 14. This year's winning dorms - Roble and Casa Zapata - each won a charter bus for a weekend trip to Lake Tahoe. Roble had the highest number of participants (196), while Casa Zapata won a three-way-tie prize drawing with two other dorms that reached 100% participation.

The FROSH Bike Helmet Subsidy Program may have helped increase participation. Freshman students contribute $5 each for a helmet, with the remaining $15 subsidized by P&TS, Public Safety, Risk Management and Residential Education, with the Campus Bike Shop providing logistical support. Stanford's bike helmet subsidy program and Bike Safety Dorm Challenge are part of the university's efforts to protect lives and limbs by encouraging cyclists to ride safely and to wear a helmet to reduce the risk of injury, including traumatic brain injury.

More Information:

https://pmplus.stanford.edu/pats/transportation/dormchallenge/

CLIMATE & ENERGY

Sixth Annual Campus GHG Emissions Inventory Verified

For the sixth consecutive year, Stanford received third-party verification of its greenhouse gas (GHG) emissions inventory. Stanford's 2011 emissions were verified through the Climate Registry. The university's carbon dioxide GHG emissions for Scope I and Scope II from the main campus totaled approximately 198,400 metric tons. The campus also prepared unofficial inventories of its Scope III commute and air travel emissions, as well as those attributed to steam and chilled-water deliveries to Stanford Hospital and Clinics. In 2011, emissions increased by about 1%, reflecting campus growth and increased research building intensity. Stanford continues to serve as a leader among higher education institutions in this area, having completed an emissions inventory each year since 2006. The annual tracking continues to be a valuable tool for Stanford's climate action planning.

More Information:

http://sustainable.stanford.edu/emissions_inventory

INTERDISCIPLINARY RESEARCH

National Geographic Honors Solar Market Garden Project

The Benin solar market garden project, led by Center on Food Security and the Environment (FSE) Fellow Jennifer Burney, was named one of *National Geographic's* Five Most Hopeful Energy Stories of 2012. The initiative, which the magazine previously featured in a March 2012 article, aims to bring solar-powered drip-irrigation systems to arid regions with endemic food shortages. This project started with funding from the Stanford Woods Institute's Environmental Venture Projects (EVP) program.

The FSE project involves an economic and environmental assessment of a novel program by a nongovernmental organization – the Solar Electric Light Fund (SELF) – which uses solar power to pump irrigation and drinking water in a set of rural villages in northern Benin, West Africa. Building on a research design in which the villages receiving the technology are selected at random, the project surveys treatment and control villages to isolate the effects of rural solar electrification on incomes, health and environmental well-being. FSE began its partnership with SELF in 2007 with EVP support. Since then, FSE researchers have worked collaboratively with SELF to spread the technology into more West African villages.

More Information:

http://stanford.io/15VEjar

TRAINING & EDUCATION

Energy Seminar Launches Entrepreneurship Miniseries

This January, the Energy Seminar launched a miniseries on entrepreneurship in energy, featuring lectures from seasoned professionals running successful energy technology companies, as well as recent Stanford graduates working in energy startups. The talks covered topics such as tactical aspects of starting up a new venture, key drivers for selecting the technology space in which to start a company and other challenges that arise in founding a new energy technology company. The Energy Seminar organizes several miniseries throughout the year; the spring 2013 Rising Power series focused on the money, politics and technology driving China's energy expansion.

The miniseries are elements of the weekly Energy Seminar, chaired by Professor Sally Benson and managed by the Precourt Institute for Energy and the Woods Institute for the Environment. The series was designed by Jeff Ball at the Steyer-Taylor Center for Energy Policy and Finance. The seminar informs the Stanford community about a wide range of energy and climate change issues, perspectives and solutions. The audience includes faculty, graduate and undergraduate students, staff from the university and SLAC and Northern California energy professionals. The Energy Seminar posts details on future lectures and video archives of past lectures online. It is offered as a for-credit course for Stanford students (CEE301/ENERGY301) and is free and open to the public.

More Information:

http://energyseminar.stanford.edu

Building Level Sustainability Program Celebrates Five-Year Anniversary with Record Participation

The Building Level Sustainability Program (BLSP) launched three pilot projects in 2009 to demonstrate the measurable impact of individual actions on efficient resource consumption. Now 41 campus buildings are participating—almost half of those originally identified as prime candidates. Over its five-year history BLSP has continually improved to better serve the Stanford community. The program now includes step-by-step How-to Guides, the Energy Retrofit Program (ERP) Express rebate program, the annual "Be Your Building's Hero" awareness campaign and formalized training. BLSP continues to gain traction and visibility. In fiscal year 2013, BLSP distributed ERP Express rebates for installation of 30 Smart Strips and 55 timers, which will save more than $2,000 a year in electricity costs. This brings the total savings to date to $17,000 per year from installation of Smart Strips and timers in participant buildings. With these and other actions, such as replacement of incandescent light bulbs, computer power management, selective delamping of overhead fixtures, low-flow faucet aerator installation, voluntary compost programs and other initiatives, building occupants across campus are working together to create a more sustainable community. In fiscal year 2014, the program will launch a drop-in educational resource center and an increased focus on plug load management.

More Information:

http://sustainable.stanford.edu/building_level_sustainability

Winter Closure Campaign Saves Energy

The 2012-13 winter curtailment and Turn Off for Break campaign came to a close with great results, saving over $250,000 for the university. During the two-week curtailment period, buildings are encouraged to turn off heat and ventilation and cancel custodial services while occupants are on vacation. These efforts conserve energy while reducing operating expenses. In 2012-13, six buildings increased their participation level, for a total of 168 buildings participating either fully or partially. Their combined conservation efforts led to resource savings of 1.8 million kilowatt-hours of electricity (a 17% increase over the previous year) and 3.5 million pounds of steam. This is equivalent to 882 metric tons of CO_2 emissions avoided. Campus savings from the winter curtailment program have totaled over $2.7million since 2001. The Office of Sustainability continues to build upon the success of this year's campaign to achieve even greater savings in the future.

More Information:

http://sustainable.stanford.edu/be_cardinal_green_winter_closure

TRANSPORTATION

Stanford Wins Best Workplaces for Commuters Gold Award

Best Workplaces for Commuters awarded Stanford's transportation demand management program its Gold award in the University category. Stanford was one of 23 employers nationwide recognized in the organization's Race to Excellence.

Best Workplaces for Commuters is a program designed to encourage sustainable transportation innovation. The awards recognize organizations that have taken exemplary steps, such as offering vanpool and transit benefits, to facilitate transportation alternatives for their employees.

"The annual Race to Excellence provides national recognition for employers who offer high-level commuter benefits," said Julie Bond, the National Center for Transit Research's national program manager for Best Workplaces for Commuters. "Offering commuter benefits is a win-win situation for employees who change their commuting habits to save time, money and stress and employers who gain a competitive edge in employee recruitment and retention."

More Information:

http://bit.ly/179ExJ7

STUDENT LEADERSHIP & ACTIVITIES

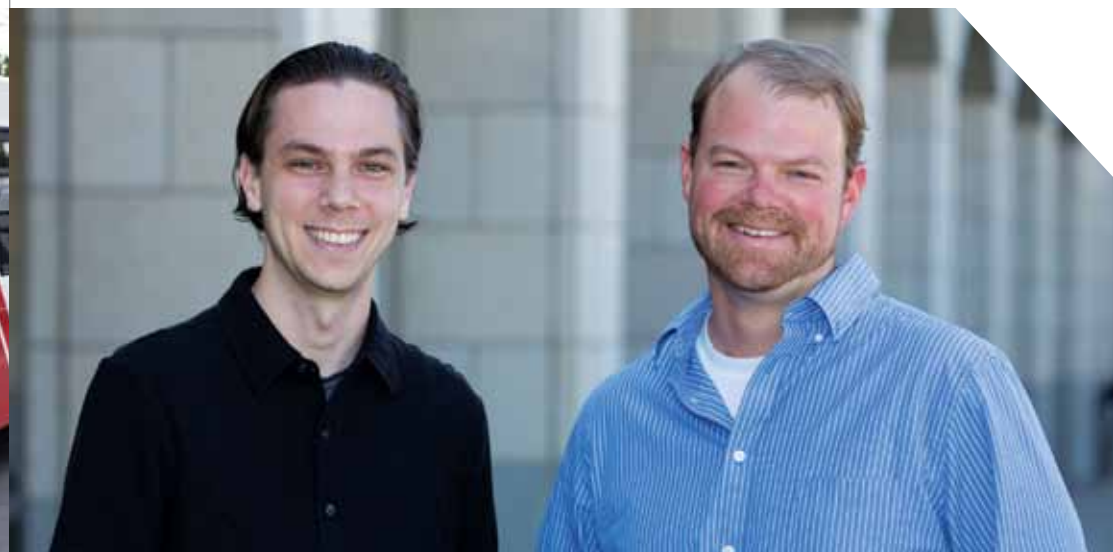
Generation Anthropocene Airs 50th Podcast Episode

Generation Anthropocene celebrated its 50th podcast episode with a roundtable discussion of the geologic Anthropocene boundary. This volunteer-based podcast series began as a class in the winter 2012 quarter and is produced by a group of Stanford students, graduates and lecturers. With both the global population and the planet's temperature continuing to rise, the Earth is experiencing a major transformation. According to the group, this transformation is ushering the planet into a new geologic age: the Anthropocene. The series features long-form interviews with a diverse working group of Stanford scientists and experts, covering topics related to the Anthropocene, including geochemistry, environmental history and even religion.

Generation Anthropocene listenership covers 130 different countries and over 3,000 cities worldwide. This year, founders Miles Traer and Mike Osborne (pictured below) gave a TEDx talk at Stanford that addressed the Anthropocene and connections between Earth systems and humanity. With 50 episodes now under its belt, *Generation Anthropocene* plans to expand content offerings in the months ahead.

More Information:

http://stanford.io/15Gv9fR



Food Policy Symposium Highlights Africa's Food Systems

This February, members of the public and Stanford community were invited to attend a lecture and reception focused on food production and agribusiness challenges in Africa. Featuring two expert speakers, the lecture was part of the Global Food Policy and Food Security Symposium series, hosted by Stanford's Center on Food Security and the Environment (FSE). Delivering the Africa's Food Systems in 2030 lecture were Paul Collier, director of the Centre for the Study of African Economies at Oxford University, and Derek Byerlee, codirector of the 2008 World Development Report. Collier posited that African food production has failed to keep pace with demand, pointing to issues with innovation and investment, while Byerlee focused his discussion on cross-cutting policy priorities to enable the growth of commercial agriculture and agribusiness in Africa.

FSE's Global Food Policy and Food Security Symposium series brings the world's leading policy experts in food and agricultural development to Stanford to participate in an integrated, 12-lecture series on pro-poor growth and food security policy. Participants address the major themes of hunger and rural poverty, agricultural productivity, resource and climate constraints on agriculture, and food and agriculture policy.

More Information:

http://stanford.io/1eNTgyf

Oscar-Winning *Chasing Ice* Screened

Chasing Ice, the acclaimed Oscar-winning documentary, was screened for free on campus on March 4 and was followed by a panel discussion with the film's producer and director, Jeff Orlowski, and three Stanford Woods Institute fellows who focus on climate change: Terry Root, Noah Diffenbaugh and Michael Wara. Orlowski, who graduated from Stanford in 2007, is the founder of Exposure, a film company dedicated to socially relevant films. Root, who is featured in the film, works on large-scale ecological questions with a focus on impacts of global warming. Diffenbaugh's research centers on the dynamics and impacts of climate variability and change, and Wara is an expert on environmental law and policy. Yost House in Residential Education hosted the event in collaboration with the Stanford Woods Institute.

Chasing Ice chronicles the story of photographer James Balog's mission to gather evidence of our changing planet. Balog and his team deployed time-lapse cameras across the Arctic to capture the world's glaciers as they melted over the course of several years. The result compresses years into seconds and documents ancient mountains of ice disappearing. *Chasing Ice* has won nearly 20 awards at film festivals around the world, including the Sundance Film Festival's Excellence in Cinematography Award for a U.S. documentary.

More Information:

http://stanford.io/1a87che

Stanford Launches New Environmental Quality and Water Efficiency Website

Stanford's Utilities Services Environmental Quality and Water Efficiency group launched a newly updated website in February with the goal of making environmental quality, compliance and water efficiency information more readily accessible to the entire campus community. The easily navigable website contains detailed information on a variety of useful topics such as water efficiency, drinking water, storm water and wastewater. Resources include residential rebate information, a water footprint calculator, statistics on Stanford's water quality and water consumption, information for renovations and new building design guidelines, environmental compliance guidelines and much more. The interactive Water Conservation Program map provides a view of all campus water conservation projects. The storm water page offers resources to assist with construction storm water permitting on the Stanford campus, including a FAQ sheet, erosivity risk calculator and detailed watershed map. The Utilities Services Environmental Quality and Water Efficiency team will continue to update this site with the latest news and project information throughout the year.

More Information:

http://stanford.io/12Hh8uj

http://stanford.io/10yJHuT

R&DE Stanford Dining Hall Gardens Get Growing

In addition to serving local and sustainable food, Residential & Dining Enterprises (R&DE) works to teach students about the origins of the food it serves – from seed to table. R&DE Stanford Dining has built seven gardens, one next to almost every dining hall, that serve as living laboratories and demonstration gardens for students. Under the direction of the Sustainable Food Program Manager, each garden is run by a student intern tasked with keeping the garden growing and planning garden work days for students. This year, over 30 students applied for the eight coveted garden intern positions.

Each garden is unique, and plants are selected to match either the dining hall's theme or the chef's requests. This past year, the gardens grew a host of interesting fruits, vegetables and herbs, many of which were frequently featured on the dining hall menus.

Student managers also worked to bring the gardens to the rest of the campus community by sharing herb seeds at events and helping students and staff plant their own seeds to take home and grow. In the summer, when the students are gone, the gardens transition into a learning space for Stanford staff.

More Information:

http://dining.stanford.edu/sustainable-food-program

Students Host Clothing Swap as Launch for Closetloop Website

This spring, Closetloop, a 2012-13 Green Fund grant recipient, hosted a clothing swap event for the Stanford community. The goal of the event was to reduce waste and encourage reuse of clothing. Students brought articles of clothing they no longer wanted and traded them for clothing brought by others. The event also featured a craft station for visitors to stud, sparkle and revamp their clothes. Over 100 students brought clothing to the event, and many used the do-it-yourself station to bring new life to their clothes.

The event was the launch for Closetloop's website, which enables students to sell gently used clothing to one another at an affordable cost. The website and accompanying blog address waste reduction, resource management and behavior choices by encouraging reusing and refreshing clothing instead of throwing it away, and by placing an emphasis on choosing environmentally friendly brands for new clothing. The group continues to work to expand the website and initiative to positively affect both Stanford's waste stream and student consumer choices.

More Information:

http://www.closetloop.com

Stanford-MIT Energy Game-Changers Hold Workshop in D.C.

Energy researchers from Stanford and the Massachusetts Institute of Technology (MIT) met with members of Congress and the Obama administration to discuss game-changing energy technologies that will boost America's long-term economic growth and address serious energy challenges, including climate change and reliability of supplies. Briefing policymakers was part of the 2013 Stanford-MIT Game-Changers Workshop, which was held in Washington, D.C., on March 7. Former U.S. Secretary of State George Shultz, chair of the Shultz-Stephenson Task Force on Energy Policy at Stanford's Hoover Institution, and Rafael Reif, president of MIT, hosted the collaboration. Topics included transportation, reducing oil dependence, decarbonizing energy and the next steps in moving the energy innovation agenda forward.

Shultz advocated implementation of a revenue-neutral carbon tax in the United States to help reduce greenhouse gas emissions. In his proposal, every dollar raised by the new tax would reduce existing income taxes. Shultz's plan continues to garner coverage from media, including the *New York Times*, the *San Francisco Chronicle*, CNN and *Scientific American*.

More Information:

http://stanford.io/18Ffh9X

Stanford Reduces Waste During RecycleMania Competition

Reducing our waste footprint is a priority at Stanford; while we divert a significant amount of waste, more than half of what still goes to the landfill could be reused, recycled or composted. This year, in conjunction with the national RecycleMania competition, Stanford challenged all campus members to join the pledge to not just recycle but also reduce, reuse, rot (compost) and rebuy (recycled products). Students and staff pledged online to recycle and reduce waste, and several were awarded gift cards for their participation.

The Office of Sustainability also offered a staff training that provided a hands-on crash course in best practices in waste reduction. Available through AXESS, the course was the second in a series of Sustainable Stanford training courses aimed at providing tools and resources to help Stanford employees act as sustainable workplace leaders. Through these efforts, Stanford improved its overall RecycleMania waste benchmarking numbers, earning its best (lowest) landfill-per-person score since first entering the contest seven years ago and scoring in the top 20 in five of the eight categories.

More Information:

http://ssu.stanford.edu/5r

Over 1,000 Trees Relocated Through Transplant Program

In March 2013, the number of trees that Stanford had transplanted on campus rose to a total of 1,048. Since 1996, the transplant program has moved and transplanted campus trees, including oaks, olives, redwoods, pines and cedars. The trees provide shade for people, habitats for birds and squirrels, and landscapes that help new buildings “settle into” their environs. Rather than demolishing trees at campus construction sites, Stanford boxes them up, moves them to temporary homes and returns them to the sites once construction is complete.

While transplanted trees may be a small part of the total tree population on campus, the transplant program is a unique example of the university’s commitment to sustainability and to stewardship of the 8,000 acres bequeathed by founders Jane and Leland Stanford. Stanford arborists closely monitor the health of transplanted trees and, over the years, have refined the selection of transplant candidates, methods of boxing and moving the trees, and the levels of care required at each stage of the process – resulting in an impressive 85% survival rate.

More Information:

http://stanford.io/159PXbZ

Solar Decathlon Team Begins Construction, Gains National Attention

In April 2013, the first-ever Stanford Solar Decathlon team broke ground on its "net zero" home, which will run completely on solar power. It also located a permanent resting place for the structure following the competition: Jasper Ridge, where it will provide a home for the resident ranger. The team will compete at the national Solar Decathlon in October 2013.

The Solar Decathlon team has conceived of a unique building design that could change industry. Featured online by Fast Company, the design is based around a modular core with the building's most essential components already installed. By putting all of the functional components in a single portion, the design can minimize building and installation costs while improving efficiency. The house is being built in the center of campus to help spread awareness, and the team has already begun offering tours. Its hope is that the Solar Decathlon group will become a permanent fixture on campus and participate in many competitions to come.

More Information:

http://solardecathlon.stanford.edu

Water and Energy Wars Get Serious

During spring quarter, the Green Living Council (GLC), in concert with R&DE Student Housing, the Office of Sustainability and CALPIRG Energy Service Corps, organized Stanford's second annual participation in Campus Conservation Nationals, a nationwide college and university competition to conserve electricity and water.

Select undergraduate residences at Stanford participated in two monthlong competitions. Energy Wars pitted the Wilbur and Stern complexes against each other in conserving electricity. Meanwhile, Water Wars focused on water conservation in Crothers Hall, Crothers Memorial, Branner Hall, Kimball Hall, East Florence Moore Complex and West Florence Moore Complex. Both competitions used real-time dashboards to inform and engage residents while providing metrics.

Through a concerted outreach campaign, which included emails, kick-off parties, online pledges and related events, the competitions were a success. Overall, Energy Wars resulted in a 15% energy reduction and a 6% reduction in water.GLC is already planning for next year's competitions with ideas to make them even bigger and better.

More Information:

http://on.fb.me/19lgrs4

http://on.fb.me/1gFcbaT

STUDENT LEADERSHIP & ACTIVITIES

SEC Lays Out Energy Week

Every spring quarter, the Stanford Energy Club (SEC) presents Stanford Energy Week, a week of cross-campus collaboration that features high-quality energy-centric events. This year's most influential events included a lecture by Al Gore (hosted by Students for a Sustainable Stanford and the Stanford Woods Institute) and a technology and research showcase by students and local startups.

Two major back-to-back events capped off the week. The SEC partnered with the U.S. Department of Energy (DOE) and Berkeley to produce a speaker series that highlighted the opportunities for a new generation of Americans to take the lead in creating sustainable energy solutions. The SEC also partnered with the Stanford Business School's Center for Social Innovation and Ultra Light Startups to produce the week's capstone event, Future Energy Pitch Night. Eight innovative technologies in the energy/cleantech space were presented to a panel of industry-leading venture capitalists, strategic investors and policy leaders. Presenters received invaluable feedback, and this year's winner was featured in *Greentech Media*.

The SEC is the largest student energy organization at Stanford. It brings together Stanford students, scholars and local professionals from all disciplines to generate thought-provoking discussions and facilitate innovations that address some of the world's most complex challenges.

More Information:

http://energyclub.stanford.edu

CLIMATE & ENERGY

Al Gore Visits Campus to Inaugurate Stephen H. Schneider Memorial Lecture

Former vice president and Nobel Peace Prize winner Al Gore delivered the inaugural Stephen H. Schneider Memorial Lecture to a full house at Memorial Auditorium. The lecture honors Schneider, a Stanford professor, who died in 2010. Schneider and Gore worked together on several projects and, along with the Intergovernmental Panel on Climate Change, shared the 2007 Nobel Peace Prize for "informing the world of the dangers posed by climate change."

Gore encouraged audience members to let their elected representatives know about their climate change concerns, to work hard to re-elect those who vote for meaningful change, and to help defeat those who don't. In a far-reaching, impassioned call to civic and environmental action, he warned against a political system that fails to serve the majority's interest when it comes to climate change and other pressing issues. Gore concluded by urging students to become politically active to bring about positive environmental change.

More Information:

http://stanford.io/1fetqSE

Connecting the Dots Explores Sustainability Interconnections

Stanford experts from a range of disciplines discussed the interconnections and interactions among humanity's needs for and use of energy, food, water and other environmental resources at Connecting the Dots 2013: The Energy, Food, Water and Climate Nexus. Drawing on their own research, the speakers illustrated and evaluated ways in which decisions in one resource area can lead to trade-offs or cobenefits in others. Stanford postdoctoral scholars and graduate students led interactive breakout sessions to explore the Keystone XL pipeline, hydraulic fracturing for natural gas, barriers to changing consumer habits and global water scarcity. Connecting the Dots was part of Stanford Energy Week.

Held April 19 in the Arrillaga Alumni Center, Connecting the Dots was organized by the TomKat Center for Sustainable Energy, in partnership with the Precourt Institute for Energy, the School of Earth Sciences, the Stanford Woods Institute for the Environment, the Stanford Center on Food Security and the Environment and the Steyer-Taylor Center for Energy Policy and Finance. This was the third annual production of Connecting the Dots, which has become a centerpiece of sustainability in academia and research at Stanford.

More Information:

http://tomkat.stanford.edu/ctd/

TRACERS Antarctica Research Voyage Concludes

This winter, Stanford Earth sciences Professor Rob Dunbar helped lead a voyage to Antarctica to learn what happens to the food supply in the Ross Sea at the onset of winter. TRacing the fate of Algal Carbon Export in the Ross Sea (TRACERS) is a collaborative research initiative involving scientists and students from several universities. Funded by the National Science Foundation and employing its ice-breaking research vessel the *Nathaniel B. Palmer*, the journey was the first ever seeking to trace the world's largest phytoplankton bloom – so large it can be seen from space – in February and March when the days grow shorter and temperatures drop. The bloom is well documented in the height of summer when weather conditions are favorable, but no one knows what happens to all the organic carbon as the continent slips into winter. Dunbar and his collaborators sought to determine this by sampling columns of water at a variety of locations, depths and points in time. The researchers spent approximately two months in the Ross Sea and Southern Ocean before disembarking in Chile in early April. The team hopes that its research will move the scientific community towards closing the carbon budget in the Ross Sea, a long-held goal.

More Information:

http://bit.ly/1aXcEIr

Green Grid Radio Invited to Clinton Global Initiative University

Green Grid Radio, a student-run weekly radio program and podcast focused on energy and the environment, was invited to participate in the 2013 Clinton Global Initiative University (CGI U) meeting. Each year, CGI U hosts a meeting where students, youth organizations, topic experts and celebrities come together to discuss and develop innovative solutions to pressing global challenges. CGI U 2013 was held at Washington University in St. Louis on April 5-7, bringing together nearly 1,200 attendees.

As a prerequisite of attending the CGI U meeting, each student or youth organization develops an individual commitment to action – "a specific plan of action that addresses a pressing challenge on campus, in the community, or around the world." Green Grid Radio's commitment centers on engaging and educating listeners on sustainable energy systems in an effort to catalyze change. The student team that produces the show completed 28 episodes during the 2012-13 school year and was named a Green Podcast Worth Listening To by the *Mindful Consume*r in January 2013. Green Grid Radio airs weekly on KZSU Stanford 90.1FM and is hosted at http://greengridradio.org.

More Information:

http://greengridradio.org

Experts Convene to Address the Future of Groundwater

What do Australia and the American West have in common? These arid regions across the world from each other share a dependence on dwindling groundwater sources. That common thread brought more than 40 American and Australian government, business, academia and nonprofit organization representatives to Stanford this April for the third workshop in the Comparative Groundwater Law and Policy Program series. During the two-day workshop, cohosted by the Stanford Woods Institute, the Water in the West program and other groups, they discussed the connections between groundwater and ecosystems such as rivers and wetlands, and how ecosystem valuation – quantification of a natural system's value – could help make groundwater management more sustainable. The meeting's findings may inform the development of a new groundwater module for the Natural Capital Project Integrated Valuation of Environmental Services and Tradeoffs software.

The mission of the Water in the West program is to design, articulate and advance sustainable water management for the people and environment of the American West. The program pursues its mission and vision for a sustainable water future through cutting-edge research, creative problem solving, active collaboration with decision makers and opinion leaders, effective public communications and hands-on education of students.

More Information:

http://waterinthewest.stanford.edu/

"Celebrating Sustainability" Urges Individual Action on Earth Day

On Earth Day, April 22, faculty, staff and students came together to celebrate sustainability at Stanford. This year's Celebrating Sustainability event was an interactive festival designed to educate members of the campus community about Stanford's sustainability achievements through engaging activities and displays.

More than 35 campus departments, groups and entities; over 60 presenters; and more than 20 volunteers hosted this event at the Science and Engineering Quad. Over 1,000 guests dined on local, sustainable food provided by Stanford Catering and received reusable grocery bags as well as other environmentally friendly gifts and prizes. Student groups highlighted sustainable projects, including the Solar Decathlon team's Start.Home, which visitors could tour. Academic institutes and schools showcased sustainability initiatives, research projects and academic offerings. Stanford's various operational groups were also represented, highlighting achievements in everything from sustainable transit to water conservation and energy efficiency programs. The event was designed to have minimal environmental impact, including zero waste. All items, including compostable balloons and signage, were designed to be reusable, recyclable or compostable, and a solar generator provided electricity for the event.

More Information:

http://sustainable.stanford.edu/celebrate

Arrillaga Family Dining Commons Hosts Inaugural Earth Day Dinner

Arrillaga Family Dining Commons hosted the inaugural Earth Day dinner on April 22. The dinner was a big success, with over 1,000 students, staff and faculty attending. The dining hall was decorated with potted plants and fruit trees – later planted in the dining hall gardens – to resemble a farmers' market. Eight of R&DE Stanford Dining's vendors hosted tables: Wilcox Family Farms (suppliers of cage-free eggs); del Cabo, Jacob's Farm and Duran Farm (local organic farms); Marin Sun Farms (suppliers of local and grass-fed hamburger patties); Earthbound Farm (suppliers of organic and local spring greens); Starbucks (suppliers of fair-trade coffee); and Hodo Soy (local organic tofu company). The Stanford Food Project answered students' questions about sustainable food on campus, and R&DE Stanford Dining's garden managers hosted an herb seed planting table.

The menu featured sustainable options, with guest chefs Raul Lacara and Matthew Mina from Schwab Executive Dining preparing oven-roasted California coast whole bass with fried Castroville artichoke tempura, beluga lentil salad with poached Petaluma Araucana eggs and fried caper vinaigrette, silky Sonoma celery root and pear soup with caramelized shallots and local pancetta, and local yogurt panna cotta with apple chutney and bread pudding.

More Information:

http://dining.stanford.edu/sustainable-food-program

The Jury is In – Tap is Tasty

During the Celebrating Sustainability Festival, Stanford's Utilities Services water conservation staff hosted a water taste test, encouraging visitors to drink tap water rather than filtered or bottled water. The taste test featured unfiltered tap water from three Bay Area water sources: East Bay Municipal Utility District (EBMUD), San Francisco Public Utilities Commission (SFPUC) and San Jose Water Company (SJWC). Participants took a blind taste of all three samples and voted for the water that they liked most. A total of 158 participants completed the water taste test. In first place was SJWC with 56 votes; second place went to SFPUC with 53 votes, and EBMUD came in third with 49 votes. Stanford purchases high-quality domestic water from SFPUC for the academic campus, including School of Medicine and residential areas. Utilities Services staff compiles key information about water quality each year in Stanford's annual water quality report.

More information about Stanford's drinking water supply, as well as water quality and efficiency programs on campus, can be found on the new Environmental Quality and Water Efficiency website.

More Information:

http://stanford.io/14QbBoO

http://stanford.io/12Hh8uj

re.source Wins "Best Overall Solution" at WEST Summit

In May, two Stanford doctoral students were awarded the highest recognition at Sustainable Silicon Valley's Water, Energy, Smart Technology (WEST) Summit for their initiative to deploy portable, affordable household toilets in the developing world. A panel of judges representing NASA, Silicon Valley companies and Bay Area universities, among others, named re.source the Best Overall Solution in the Showcase of Solutions for Planetary Sustainability. The showcase highlighted game-changing ideas that "can scale to have a positive impact for sustainability at a planetary level."

The re.source project led by Stanford civil and environmental engineering doctoral students Sebastien Tilmans and Kory Russel beat out nine other finalists. The project, developed under the guidance of Jenna Davis, associate professor and senior fellow at the Stanford Woods Institute for the Environment, received seed funding from the institute's Mel Lane Student Grants Program. Working with Woods, Tilmans and Russel completed a pilot phase in which they tested several toilet models with users before deploying toilets to more than 130 households in Haiti. Now seeking funding to scale up re.source, the pair was pleased to receive the recognition at the WEST Summit. "The award is significant to us because it recognizes the importance of household-level sanitation across the world," Tilmans said. "It will help mobilize further investment and efforts in our sector."

More Information:

http://stanford.io/11U9ZUT

eARThBeat Event Showcases Interactive Art and Sustainability

eARThbeat was the fourth installment of the spring arts and sustainability festival organized by the Student Organizing Committee for the Arts and Students for a Sustainable Stanford. This year, the groups also partnered with the Institute for Diversity in the Arts, the Green Alliance for Innovative Action (GAIA), Green Grid Radio, and the Green Living Council. The event took place on May 24 from 12 to 8 p.m. on the Columbae lawn. It featured interactive art and sustainability workshops, sustainable food trucks, live music and other activities. Shalini Kantayya, an award-winning filmmaker, hosted a screening of and Q&A on her latest film, *A Drop of Life*, and Michael Christian, an artist who has presented works at Burning Man and Coachella, organized an exhibit of his latest interactive sculptures. The evening ended with the always-popular Stanford Soundtrack Release Party featuring student bands and performers. Approximately 300 students attended the event.

More Information:

http://on.fb.me/14o5iZb

Jasper Ridge Biological Preserve Celebrates 40th Anniversary

Jasper Ridge Biological Preserve, Stanford's remarkable 1,200-acre field station where pioneering scientific research has been generated in more than a dozen disciplines, recently celebrated its 40th anniversary. According to the *Stanford Report*, research conducted at the preserve has transformed fundamental ecology science since its inception in 1973. The preserve's value as a model system for long-term biologic environmental studies is incalculable, both to the university and to science.

Today, the preserve is home to some 16 species of mammals, 800 species of vascular plants and at any given time 70 to 80 research projects. Scientists point to its broad biodiversity – species in the preserve represent 10% of all California species – as one of the major features that makes Jasper Ridge such an ideal research facility. Research here has produced 1,100 scientific reports, 400 peer-reviewed publications and 100 dissertations. Now, interdisciplinary studies are providing more guidance than ever on how to apply that work to help conserve the planet. As long as Jasper Ridge's redwood groves and rolling grasslands stand, it will serve as a living laboratory to study and test potential solutions.

More Information:

http://stanford.io/1buiqRa

INTERDISCIPLINARY RESEARCH

Stanford Scientists Urge Action on Climate Change

This May, 48 Stanford scientists joined in presenting California Governor Jerry Brown with a consensus statement urging immediate and drastic action to address climate change. The document was signed by 520 scientists from 44 countries. The statement provides a number of specific policy recommendations, including actions to reduce global overpopulation, to replace fossil fuels with carbon-neutral energy sources and to plan adaptation measures for climate impacts. In receiving the statement, the governor commented on the importance of communicating the science of climate change to the public, urging the supporters of the statement to spread its message.

The statement was delivered at Sustainable Silicon Valley's Water, Energy, Smart Technology Summit on May 23 at the NASA Ames Research Center.

More Information:

http://stanford.io/1etr5o3

ENERGY EFFICIENCY

Sustainable IT Program Named Finalist in Green Enterprise IT Awards

On May 13 the Uptime Institute honored Stanford as a finalist in its 2013 Green Enterprise IT Awards. Stanford's case study featured server consolidation at the Clark Center, one of the top five energy-consuming buildings on campus. The Clark Center IT group was able to relocate servers from the building, where research space is at a premium, over to a new centralized data center, where servers are able to operate at much higher efficiencies.

The project resulted in impressive benefits, including annual energy cost savings of over $65,000 and the release of valuable research real estate at the Clark Center (the released space is valued at approximately $1 million, as research space is at a premium on campus). The project allowed a flexible and smooth migration of computers as well as scalability to accommodate new systems, and demonstrated a great partnership among the Clark IT group, Bio-X researchers and Sustainability and Energy Management.

More Information:

http://bit.ly/17g8bct

TRANSPORTATION

Capri Rewards Biking and Walking in Addition to Off-peak Commutes

In June, Stanford's Capri (Congestion and Parking Relief Incentives) program introduced My Beats, a smartphone app for iPhone and Android. Using GPS, the app enables participants to earn credits for each direction of their bike or walk commute to and from campus, with chances to win cash prizes of $1 to $50 in an online game. The My Beats app for bicyclists and walkers expands the Capri program, which launched in 2012 to reward eligible commuters who choose to drive during off-peak times. Avoiding peak-hour driving helps reduce the time spent sitting in traffic and reduces emissions, while also supporting the university's transportation goal under its General Use Permit. Peak times to avoid driving are main campus arrivals between 8 a.m. and 9 a.m. and departures between 5 p.m. and 6 p.m. Peak commute time restrictions do not apply to bike, walk or transit commuters, who support the university's goals by not driving a car to campus.

With funding from the U.S. Department of Transportation, Capri is an innovative research project led by Professor Balaji Prabhakar and his team from Electrical Engineering and Computer Science in collaboration with Stanford's Parking & Transportation Services. The research project is designed to determine whether organizations and governments can reduce traffic and corresponding greenhouse gas and other emissions through a fun, interactive and incentive-based approach to behavior change.

More Information:

http://capri.stanford.edu

FOOD & LIVING

R&DE Student Housing Celebrates Student Sustainability Contributions

Residential and Dining Enterprises' (R&DE)'s Student Housing celebrated the accomplishments of student interns who participated in the first Housing Sustainability and Conservation Internship (HSCI) program for the academic year this May. The new internship program provided opportunities for students to work on projects that educate and promote a more sustainable lifestyle among peers and campus staff living in housing. The HSCI program helped student interns gain valuable real-world experience, while helping Student Housing reduce the environmental footprint of its campus operations and see tangible cost savings in utilities and waste management.

The interns focused on a redesign of Green Move Out (now Give & Go), waste reduction through better composting program pilots, student incentive programs for sustainable living, and prioritization of utility metering installation. Select outcomes included a successful end-of-the-year Give & Go Move Out donation program diverting almost 50 tons of reusable material from the landfill and successful composting pilot projects that diverted 50% of landfill waste.

The successful HSCI program will be integrated into the broader Sustainable Stanford Internship Program next year, along with internships with the Office of Sustainability and Peninsula Sanitary Service, Inc.

More Information:

http://studenthousing.stanford.edu/sustainableliving

Law School Symposium Addresses Dynamic Ocean Conservation Issues

On May 10-11, the Stanford Law School and the Center for Ocean Solutions hosted a symposium focused on cutting-edge topics in dynamic ocean conservation law, science and policy. The two-day Emerging Perspectives on the Law, Science, and Policy of Dynamic Marine Conservation Symposium convened speakers and experts from across the globe to foster cross-disciplinary approaches to complex maritime problems at local, national and international levels.

The symposium featured keynote addresses from speakers Kristina M. Gjerde (senior high seas policy advisor, IUCN Global Marine and Polar Programme) and Jane Lubchenco (former administrator of NOAA; Mimi and Peter E. Haas Distinguished Visitor, Stanford Haas Center for Public Service). Panel topics included dynamic management of global fisheries, ocean conservation evaluation and monitoring, and modeling and protection of marine ecosystems.

A special joint issue presenting original collaborative papers by symposium panelists will be published online starting December 2013 in the *Stanford Environmental Law Journal* and the *Stanford Journal of Law, Science, and Policy*.

More Information:

http://stanford.io/18FiMx4

Global Energy Assessment Provides Roadmap to Sustainable Energy for All

The world could supply affordable, modern energy to the 3 billion humans who do not have it currently by 2030, while simultaneously cutting greenhouse gas emissions, according to many of the contributors to *Global Energy Assessment: Toward a Sustainable Future*. The scholars arrived at Stanford from all over the world to promote the findings in their encyclopedic work during a two-day forum. Executing the assessment's program would require increasing global investments in energy infrastructure by a third to two-thirds, but the costs of climate change and of people living without modern energy services are much greater. For example, smoke from cooking indoors using coal, wood or cow dung as fuel without proper ventilation kills an estimated 2.2 million people annually, mostly women and children. "The opportunity to improve people's quality of life is so great," said Sally Benson, Stanford professor and acting director of the Precourt Institute for Energy, which hosted the meeting. "Clearly, nobody should ever cook indoors with traditional biofuels. Cost-effective and sustainable alternatives are urgently needed." The assessment's approach relies on the private sector, not public subsidies, to transform the world's energy systems, though appropriate, complementary government policies are also needed.

More Information:

http://stanford.io/19liYCO

http://bit.ly/1dtACIJ

INTERDISCIPLINARY RESEARCH

GCEP Tackles Sustainable Energy for the Developing World

Stanford's Global Climate & Energy Project (GCEP) and India's Reliance Industries cohosted a workshop in India on the search for game-changing energy technologies for the developing world. Experts from academia, industry and nongovernmental organizations analyzed global energy needs, potential applications for new technologies and collaborations to advance research on practical solutions for supplying energy to developing countries.

Ajit Sapre, Reliance group president of research and technology, sparked the meeting during his talk at the annual GCEP Research Symposium at Stanford last year. Sapre discussed an approach to global energy challenges, inspired by Mahatma Gandhi, called "Gandhian engineering of inclusive innovation." The concept: Sustainability can be achieved by eradicating poverty through the development of energy-efficient technologies that are high quality and affordable. While in India, GCEP got a firsthand look at the energy and sustainability challenges with a tour of four remote farming villages that have Reliance Foundation pilot programs to improve agricultural yields and provide access to cleaner energy.

More Information:

http://stanford.io/1aXe4CJ

STUDENT LEADERSHIP & ACTIVITIES

Green Fund Wraps Up Fifth Successful Year

The Stanford Student Green Fund, now in its fifth year, concluded its 2012-13 projects in June with student presentations showcasing accomplishments in eight different areas. Highlights of this year's Green Fund projects, made possible by $28,000 in grants from the Office of Sustainability, include the Stanford Food Project, which held 24 events in its Farm to Fork series of workshops, lectures and cooking demonstrations; Students for a Sustainable Stanford's Water Group who released a revamped leak reporting iPhone app and are preparing to install a rainwater harvesting system at Synergy House; the Stanford Solar and Wind Energy Project, who held a design workshop for 30 students to create plans for a campus solar charging station & installed a demonstration station behind Mitchell Earth Sciences Building for the month of June; and the Green Living Council who held another successful Water Wars competition and expanded into an Energy Wars competition as well.

A final report detailing all of this year's Green Fund projects is available on the Sustainable Stanford website.

More Information:

http://ssu.stanford.edu/green_fund

STUDENT LEADERSHIP & ACTIVITIES

Earth Systems Hosts Annual Art + Science Exhibition

The Stanford community is full of incredibly passionate scientists, but it is also full of creativity and artistry, with many students and faculty drawing their creative inspiration from the scientific concepts they care so much about. With this in mind, the annual Earth Systems Art + Science Exhibition celebrates the fusion of artistic and scientific talents at a year-end art show and barbecue event.

Sponsored by the Earth Systems Program and the Department of Environmental Earth System Science, the 2013 Art + Science Exhibition solicited student artwork submissions across all forms of media. The event was held on May 31 at the Y2E2 courtyard and Red Atrium and featured art displays, live performances, food, drink and prizes for Earth Systems students. This annual celebration is a great example of the diversity of interests and passions within the sustainability scene at Stanford.

More Information:

http://stanford.io/16jlc3M

INTERDISCIPLINARY RESEARCH

Silicon Valley Energy Summit Convenes Sustainable Business Leaders

Held on June 28 at the Frances C. Arrillaga Alumni Center, the Silicon Valley Energy Summit (SVES) explored best practices, upcoming technologies, government regulation and energy policy. Convened by Stanford's Precourt Energy Efficiency Center, SVES traditionally benefits more than 500 investors, facilities managers, regulators, researchers and others dealing with energy economics and environmental impacts.

This year's keynote speakers included former Energy Secretary Steven Chu (professor of physics and molecular & cellular physiology, Stanford), Arati Prabhakar (director, U.S. Department of Defense Advanced Research Projects Agency), former Senator Jeff Bingaman (distinguished fellow, Stanford Law School, Steyer-Taylor Center for Energy & Policy) and former Secretary of Defense William Perry (senior fellow, Freeman Spogli Institute, Stanford). Topics addressed at the conference included federal energy policy, implementation of California's carbon cuts, zero-energy buildings, entrepreneurs and consumer technologies, and cybersecurity for the smart grid.

More Information:

http://stanford.io/18eeCQO

Give & Go Move Out Campaign Diverts Record Amount of Reusable Items

Over 2,000 students participated in the R&DE Student Housing Give & Go Move Out program in June. The program's goal was to divert as many of students' unwanted reusable items from landfill as possible by offering convenient opportunities to donate those items to those in need in the local community. While encouraging donations at move out is not new for R&DE Student Housing, the reinvented program offered expanded service with more than 200 convenient donation locations across undergraduate and graduate housing, a new outreach program that garnered more than 425 online student pledges to give and sign in at donation locations, an onsite student coordinator program to provide peer-to-peer education and oversight, and well-structured partnerships that provided opportunities to collect results for the first time.

In total over 97,500 pounds (almost 50 tons) of materials, including clothing, food, appliances, furniture and books, were collected by Goodwill, Ecumenical Hunger Program and InnVision Shelter Network. At least 15% of the total waste generated during move out was diverted from the landfill, saving R&DE between $2,900 and $5,000 in landfill and hauling costs and over $10,000 (estimated) in extra labor. This was a very popular campaign and will continue to be offered annually.

More Information:

http://stanford.io/1gFf8rZ

Solar Car Project Unveils Luminos

The Stanford Solar Car Project this summer unveiled "Luminos," a sleek, new aerodynamic vehicle built to compete in the 2013 World Solar Challenge. Luminos is the Stanford Solar Car Project's 11th vehicle since its founding in 1989. Nearly two years of planning, design, fundraising, logistics, building and testing went into producing the new vehicle. Luminos features several innovative practices and technologies, including drive motors designed and constructed by the team. The new motors have been verified to have a higher system efficiency than the team's competitors' motors by a significant margin, while still allowing for a significantly superior mechanical design.

The Stanford Solar Car Project is an entirely student-run non-profit organization. The team designs and builds solar powered cars to race in the 2000 mile-long World Solar Challenge in the Australian outback. The project team provides a unique opportunity for Stanford students to gain valuable hands-on engineering and business experience while raising community awareness of clean energy vehicles.

More Information:

http://solarcar.stanford.edu/

NEW BUILDINGS & RENOVATIONS

Stanford's Y2E2 Building Achieves Platinum Grade

The U.S. Green Building Council (USGBC) awarded the highest certification for sustainability in operations and maintenance to Stanford's Jerry Yang and Akiko Yamazaki Environment and Energy Building (Y2E2). Y2E2, the first large-scale, high-performance building at Stanford, was designed to conserve natural resources and offer a unique learning environment. The building's innovative design delivers substantial efficiency gains over similar standard buildings, using significantly less energy and potable water. In summer 2013 Y2E2 earned a LEED for Existing Buildings: Operations & Maintenance (EBOM) Platinum certification, the highest rating awarded by the USGBC. As the first LEED-EBOM certification on campus, the Y2E2 project allowed Stanford to evaluate the benefits of the certification process and further investigate opportunities in design and operation of high-performance buildings.

Sponsored by the Stanford Woods Institute for the Environment, the Y2E2 LEED certification project was coordinated through Stanford's Office of Sustainability with support from Science and Engineering Quad facilities and operations staff. ARUP, the design and engineering firm for Y2E2 and the other SEQ buildings, provided associated consulting services and engineering analysis.

More Information:

http://stanford.io/164H2Lq

COMMUNICATIONS & OUTREACH

Office of Sustainability Launches Self-Guided Sustainability Tour

Sustainability has a major presence at Stanford. Integrated into academics, campus operations, events, and communications, sustainability practices are reducing the university's environmental impact while saving resources – creating a true sense of value and community across campus. In an effort to capture and share some of the tangible and intangible aspects of sustainability at Stanford, the Office of Sustainability this summer launched an online tour for campus visitors. The tour provides a snapshot of various projects and initiatives through a self-guided route that showcases highlights from Stanford's many sustainability partners on campus. Available online and in a mobile-friendly format, the new site allows interested visitors to experience the tour either walking around campus or from the comfort of their home computer. This site will be enhanced with additional features in coming years.

More Information:

http://stanford.io/1c6lFg1

Stanford Awarded Highest Green Rating by Princeton Review

The Princeton Review named Stanford to its "2014 Green Rating Honor Roll" as one of 22 colleges and universities selected by the education services company as the most environmentally friendly schools in the nation. Stanford, along with 21 other colleges and universities, received the highest score – 99 – on the annual rating. Under the green rating project, now in its sixth year, schools are scored on a scale of 60 to 99. This year, the Princeton Review tallied "green rating scores" for 832 colleges.

The "green rating" scores are based on data the company obtained from the colleges in response to a 2012-13 institutional survey with 10 questions. As part of its portfolio of evaluations work, Stanford's Office of Sustainability tracks key performance indicators related to campus resource use and trends. This data is made available for third party evaluations like the Princeton Review.

More Information:

http://stanford.io/159SYsS

http://bit.ly/1eWh57O

SESI Wins APPA Award, Industry Recognition for Innovative Design

The Stanford Energy System Innovations (SESI) program was recognized this summer by APPA, the largest international association of educational institutions and their facilities and physical plant departments, for the innovative design of the new heat recovery system and central energy facility at Stanford. On August 2, the SESI design and construction team traveled to APPA's annual conference in Minneapolis to accept the Effective and Innovative Practices Award on behalf of Stanford. SESI was also showcased at the conference and will be featured as an award winner in *Facilities Manager* magazine. Earlier this year, industry media also recognized SESI for its innovative design and approach to improving campus energy infrastructure. Two leading trade publications – *Bay Area Building Management Resource Guide* magazine and *Today's Campus* – featured articles on Stanford's sustainability achievements, highlighting SESI.

The SESI program is a $438 million major transformation of the campus district energy system. When completed, the new heat recovery system will be 52% more efficient than the existing cogeneration system; immediately cut Stanford's greenhouse gas emissions in half and its drinking water usage by 18% and save $303 million (20%) over the next 35 years compared to the existing system.

More Information:

http://bit.ly/1fOCNbW

http://stanford.io/17QyDJm

http://bit.ly/1bhMQXt

Stanford Joins the Green Sports Alliance

The Department of Athletics, Residential Dining & Enterprise, Stanford Recycling and the Office of Sustainability have partnered to represent Stanford in the Green Sports Alliance (GSA), a national coalition of professional and collegiate sports teams and franchises dedicated to pursuing sustainability in athletics. The GSA aims to help sports teams, venues and leagues enhance their environmental performance. In recent years, the Department of Athletics has undertaken many sustainability projects in its physical campus. Examples include replacement of grass on practice fields and club sports fields with field turf to conserve water, pool covers to conserve water and energy at the outdoor swimming pools, and solar lighting installations for the stadiums. In the coming years, the Department of Athletics will be engaging in a sustainability plan as well as continuing its implementation of various programs such as sustainable food management at concessions in collaboration with Stanford Residential and Dining Enterprise, enhancing recycling and composting at the stadiums, increasing green cleaning program practices, and increasing sustainability messaging around athletic activities and communications. As a member organization, the university looks forward to both benefiting from the tools and resources provided by the Green Sports Alliance and also providing best practices in sustainability in athletics for the greater green sports community.

More Information:

http://greensportsalliance.org/members-benefits/

New Student Guide to Sustainable Living Launched

The Office of Sustainability (OOS) has offered the **Student's Guide to Sustainable Living at Stanford** as a resource to incoming students since 2008. In 2013, R&DE Sustainability Programs released the latest version with up-to-date programs and engagement opportunities. This guide is distributed electronically to the incoming class each year. A special welcome note from university leadership is included to encourage students to adopt sustainable lifestyles in accordance with Stanford's goal to achieve a culture of campus sustainability.

The updated guide highlights opportunities for students to take action on campus in order to live more sustainably. Resources include tips for being more efficient in the dorms, at the laundry machine, in the shower, and when dining around campus. This RD&E production also provides an overview of the OOS campus sustainability tour, available in print and online.

More Information:

http://stanford.io/179GTHW

Stanford Ranks in Top Ten *Sierra* "Cool Schools" for Fourth Year in a Row

For the fourth consecutive year, Stanford was recognized in *Sierra* magazine's "Cool Schools" sustainability ranking, which salutes U.S. colleges and universities that are helping solve climate problems and are making significant efforts to operate sustainably. Published in the September/October 2013 issue of *Sierra*, the feature story on the rankings highlights Stanford's sustainability efforts across operational, academic, and student initiatives. This year's ranking showed high scores for Stanford in the areas of food and dining practices as well as transportation planning, among others. In addition to the data-based rankings, the September/October issue also featured a variety of stories that examined whether sustainability efforts at colleges and universities do in fact make a difference once students graduate. Stanford continues to pursue excellence in the practice of sustainability in teaching, research, and action, and values its national leadership role.

More Information:

http://www.sierraclub.com/coolschools

CREDITS

Acknowledgements

Academic Partners:

Graduate School of Education

Graduate School of Business

Haas Center for Public Service

Precourt Institute for Energy

School of Earth Sciences

School of Engineering

School of Humanities & Sciences

School of Medicine

SLAC National Accelerator Laboratory

Stanford Law School

Stanford University Medical Center

Stanford Woods Institute for the Environment

Undergraduate Advising and Research

Vice Provost for Graduate Education

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Student Groups:

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Green Living Council

Stanford Food Project

Stanford Solar Decathlon Team

Stanford Solar and Wind Energy Project

Students for a Sustainable Stanford

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Peninsula Sanitary Service, Inc.

Residential & Dining Enterprises

University Communications

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Stanford University

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327 Bonair Siding
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