

2010

UC Berkeley

Campus Sustainability Report

“Talking Louder & Doing More”



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**University of California,
Berkeley**

August 2010

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Campus Sustainability Report

About This Report

The goal of the *2010 Campus Sustainability Report* [Report] is to provide a transparent accounting of Berkeley's progress in the past year toward reducing its environmental impacts. The Report is integral to understanding the current state of sustainability at UC Berkeley and can be used to inform policies and initiatives related to sustainability. UC Berkeley has published [three previous assessments of our progress](#), so this Report assumes general knowledge about sustainability and sustainability on campus. To find out more about current sustainability efforts on campus, visit sustainability.berkeley.edu, email the Office of Sustainability at sustainability@berkeley.edu or sign up for the [Bright Green News](#).

About the Office of Sustainability

The UC Berkeley [Office of Sustainability](#) develops, coordinates, and supports campus sustainability goals and initiatives with a focus on climate action. Our goals include fostering a culture of sustainability and helping the campus reach climate neutrality. We strive for excellence in breadth and depth, by implementing **bright green** programs to reduce our ecological footprint, raising awareness through our Talking Louder campaign, and emphasizing transparency and accountability through our plans and reports.

Acknowledgments

The Office of Sustainability would like to recognize all of those who contributed to this Report, while acknowledging that any errors or omissions remain our responsibility. The Report would not be possible without the data generated by Kira Stoll and the many others who have compiled the CalCAP inventories. We also thank The Green Initiative Fund for their generous support.

Thanks to the contributors from the Chancellor's Advisory Committee on Sustainability and the Sustainability Communications Associates for their work and enthusiasm:

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Thanks to the multiple campus stakeholders who provided up-to-date information on projects and initiatives and who reviewed the document and provided input and comments:

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Executive Summary

UC Berkeley currently works to be more sustainable through a variety of means: by work in at least nine areas, complemented by numerous cross-cutting and administrative measures. These efforts – projects, campus committees, grants, communication campaigns, reports, and other similar initiatives – are a vital part of any sustainable institution and help reduce environmental impacts at UC Berkeley.

This 2010 Campus Sustainability Report provides a snapshot of how successfully the campus has implemented projects to achieve our goals, initiated new best practices, and expanded the culture of sustainability. New features of the Report include metrics for sustainable food and total research expenditures, “At A Glance” lists of on-going work in each section, and a new “Across Campus” section looking at administrative and cross-cutting sustainability work.

Achieving Goals

- In 2009, campus **greenhouse gas emissions were down by 4.5%**, over 9,500 metric tons CO₂ equivalent (CO₂e) lower than in 2008 and the lowest level since 2005. Emissions per thousand dollars of research expenditures have dropped by over 27% since 1990. Based on the latest inventory, it is estimated that the campus needs to reduce emissions by a further 50,000 tons to reach 1990 levels and its 2014 target.
- Since 2006, the campus has completed multiple projects to **reduce energy usage** in new and existing campus buildings, reducing electricity usage by 11.5 million kWh and emissions by about 5,000 tons. Total cost savings are expected be almost \$1.4 million.
- The campus certified its second **LEED™ building project**: the Clark Kerr Campus Phase 1 Renewal (Gold, Commercial Interiors).
- The amount of municipal **solid waste** sent to landfills dropped by 12% in 2009, while per capita waste has dropped by almost 30% since 1990. The diversion rate for municipal solid waste is 42%, while the construction waste diversion rate (using the data currently available) is around 99%.
- Of the \$6.1 million of **green purchasing** in fiscal year 2008-2009, approximately two-thirds were purchases of Energy Star and/or EPEAT certified electronics, and one-quarter were recycled content offices and other supplies.
- The campus **goal of achieving a 25% reduction in fuel use from fleet and commute was met and exceeded (down 28.7% since 1990)**. The drive-alone rate for faculty and staff dropped by four percentage points (to 43%). In addition, 100% of the fleet vehicles purchases this past year were green, bringing the green fleet to almost 18% of the total fleet.
- Cal Dining continues to increase the percentage of its purchases of **sustainable food**, which has gone up almost three percentage points in the past year (to 26.8%, exceeding the campus goal).
- In April 2010, the BEARS Initiative – a campaign to **revitalize Lower Sproul**, emphasize sustainability, and promote student interests – was passed.
- The campus was recently awarded funds to develop a new **master’s program in sustainable development practices**. As part of a global network, the cross-disciplinary professional program will admit its first students in fall 2011.
- The new **Berkeley Center for Green Chemistry** will advance green chemistry through research, teaching and engagement. Through the 21st Century Chemical Science Instruction program, the College of Chemistry will redesign its undergraduate curriculum (including a new undergraduate minor in sustainability and a designated emphasis in sustainability for graduate students).

Executive Summary

New Best Practices

- Total campus **water usage** (not including residence halls) dropped by 1.2% last year and has dropped by almost 20% since 1990. More notably, usage per square foot has dropped by over 36% since 1990.
- The Marchant Building **waste reduction** partnership triaged a storage facility and successfully diverted over eight huge truckloads of items – approximately 15 tons of materials.
- Starting in spring 2010, UC Berkeley doctoral students began submitting their **dissertations electronically**.
- The ASUC Art Studio installed **two new closed-system sinks** that will collect the clay and glaze waste that previously was washed down the drain, reclaiming 15 gallons of glaze and 300 pounds of clay every six week session.
- The Banatao Institute and the Building Sustainability @ Cal (BS@C) program recently launched the **first academic building-wide composting program** in Sutardja Dai Hall.
- The Physical Plant sustainability staff completed documentation of a new **Green Cleaning Policy** that outlines sustainability criteria for cleaning products, supplies, tools, equipment, and practices.
- Starting spring semester of 2010, Crossroads, Foothill, Clark Kerr, and Café 3 dining halls have **eliminated nearly all of the plastic trays**.
- To date, there have been nine certified **green departments**, representing at least 10% of the campus staff and faculty. Facilities Services became the first campus operating unit to be fully green-certified. The Office of Sustainability has also certified 25 **green events** in the past year, which were attended by around 13,000 people. Event planners have flexibility in the steps they take to be certified, but 72% chose to offer composting and 60% offered at least 10% sustainable food.

Culture of Sustainability

- The **promotion of tap water** as part of the I Heart Tap Water campaign has reduced bottled water sales by at least 25%. The ASUC also passed [legislation](#) banning any student funds being spent on bottled water.
- The student-run [Building Sustainability @ Cal](#) program has developed **sustainability plans** for at least 25 campus buildings.
- The student-run ReUSE program has created an **on-line materials exchange site**.
- An indicator of overall interest in green purchasing is the approximately 26.3% of **office supply purchases** from our main supplier containing recycled materials.
- Parking and Transportation launched a **Zimride rideshare** system in February.
- Just four years after adoption of the Campus Bicycle Plan, the campus has increased the number of **bicycle commuters** by almost 850, a 20% increase to 5,100 daily riders.
- Through lectures, tabling, tours, roundtables, forums, and meetings, the Office of Sustainability **talked sustainability** with 7,600 faculty, staff, and students in the last 18 months.
- The **bright green news** went from a subscription base of 400 to 1,400, representing a 250% increase in readership. Attendance at four student sustainability forums grew over 400% and the number of student groups presenting also doubled from last year.

Sustainability Goals

2009 Campus Sustainability Plan	
Energy & Climate	By 2014, reduce greenhouse gas emissions to 1990 levels. (CalCAP) Achieve climate neutrality as soon as possible. (CalCAP, UCOP)
Water	By 2011 or earlier, set a water reduction goal and analyze and approve feasible water reduction, reuse, and/or recycling projects.
Built Environment	Design future projects to minimize energy and water consumption and wastewater production; incorporate sustainable design principles into capital investment decisions; base capital investment decisions on life cycle cost, including the cost of known future expenditures. (LRDP)
Waste	Achieve a 75% diversion rate by June 2012 and zero waste by 2020. (UCOP)
Purchasing	By 2011, develop a green purchasing policy.
Transportation	By 2014, reduce fuel use by commuters and campus fleet to 25% below 1990 levels.
Food & Dining	By 2020, increase sustainable food purchases by campus foodservice providers to at least 20%. (UCOP)
Land Use	Plan every new project to serve as a model of resource conservation and environmental stewardship. (LRDP)

The Campus Sustainability Goals and the key strategies for meeting them are outlined in the [2009 Campus Sustainability Plan](#) (July 2009). This plan draws from the below campus planning documents, which are also referenced in each section below.

- The [Cal Climate Action Partnership](#) (CalCAP) manages our greenhouse gas emissions reduction goal and action plan.
- The [2020 Long Range Development Plan](#) (LRDP) for UC Berkeley – and its accompanying [Environmental Impact Report](#) (LRDP EIR). Some highlights of the LRDP are included in this Plan, but more details on how UC Berkeley is reducing its broader environmental impacts are available in the documents themselves.
- The [University of California “Policy on Sustainable Practices”](#) (UCOP) outlines how the entire system will minimize environmental impacts and increase usage of renewable energy.
- The [Strawberry Creek Management Plan](#) (SCMP) continues to improve water quality in Strawberry Creek and provides hands-on training in restoration for university and K-12 students.

Sustainability Metrics

Once goals are set, **measuring the right process or outcome** is crucial to developing and maintaining a more sustainable institution. UC Berkeley has developed a set of Sustainability Metrics that were first reported in the *2008 Campus Sustainability Assessment* and were updated in the *2009 Campus Sustainability Report*.

In addition to reporting the absolute changes over time in the sustainability metrics, the Report also attempts to provide some context for the data and to share why the changes have occurred. The Report includes stories about the projects that led to the changes and also calculations of normalized metrics.

Normalizing data – which is similar to averaging – is a common way to allow better comparability over time or with other institutions, by eliminating the effect of a normalizing factor from a data series. For example, in a given year the campus might implement energy efficiency measures, but also tear down a building. Normalizing the data for the total size of buildings – calculating the **electricity efficiency** by dividing electricity usage by gross square footage – can show how much of the resulting decrease in usage was due to the upgrades versus the demolition. If the electricity efficiency is lower than the previous year rather than higher, then the positive effect of the efficiency measures is more clear. Electricity efficiency also allows the campus to benchmark our energy usage to other campuses, since it is a size-neutral calculation or the average electricity use per square foot.

In addition to normalizing by square footage, the Report also presents some data per capita and per dollar of expenditures on research. Choosing and defining these factors is not always straightforward. This report uses **gross square footage** (rather than assignable space) since this includes building space like hallways that also require energy to operate. The report has also chosen to define **population** (for per capital calculations) as the total of students, faculty, and staff. Part-time faculty and staff are included as partial full-time equivalents (FTE). Finally, **research** expenditures are the total expenditures in a fiscal year for institutes, research centers, and individual or project research, minus eliminated capital expenditures¹.

While this Report concentrates on transparency for traditional environmental indicators – such as energy and water usage – UC Berkeley separately reports on **social and economic measures of sustainability**. These additional gauges of sustainability are reported through the *University of California Accountability Report*, first published in May 2009. Designed to “ensure greater accountability across the UC system²,” the report includes data on undergraduate affordability and access, student experience, as well as research, budget, and finance.

Most of the data and metrics in this Report are from the annual greenhouse gas emissions inventories compiled by the Cal Climate Action Partnership (CalCAP). Non-CalCAP **data sources** are referenced separately. Some data can change from year to year, due to increases in the accuracy and precision of underlying statistics and methodologies. These changes are documented below and on the *CalCAP website*. Additional metrics will be evaluated for inclusion in future reports.

¹ <http://controller.berkeley.edu/FINRPTS/FinancialSchedules.htm>, accessed July 22, 2010. Data are reported in the starting year of the fiscal year (e.g., FY 2008-2009 is reported as 2008).

² *University of California Annual Accountability Report*, May 2009, <http://www.universityofcalifornia.edu/accountability/>

Sustainability Metrics

Annual Sustainability Metrics for UC Berkeley, 1990-2009

	1990	1995	2000	2007	2008	2009
Energy & Climate						
Total greenhouse gases (metric tons CO ₂ equivalent)	166,600	169,849	259,601	206,897	210,632	201,110
- GHG Scopes 1&2	116,773	123,099	216,078	161,609	166,175	159,789
Electricity (kWh)	157,105,948	171,709,091	185,666,952	212,243,455	217,841,461	218,515,767
Steam (MMBtu)	844,972	894,828	938,135	1,078,035	1,085,850	1,075,197
Natural gas (MMBtu)	156,301	162,123	155,331	227,764	221,141	219,401
Renewable energy (kW)				59	59	59
Utility-provided electricity (% renewables)	18%	18%	5%	13%	15%	14%
Water						
Water (millions of gallons)	581.2	566.2	533.5	487.4	472.0	466.3
Wastewater (millions of gallons)	418.8	388.8	359.4	342.1	326.0	330.4
Built Environment						
LEED™ buildings (#/square footage)					1 / 11,068 ft ²	2 / 112,042 ft ²
Waste						
Municipal solid waste (MSW) (short tons)	6,973	7,187	6,637	6,689	6,417	5,675
Diverted MSW (short tons)		1,075	3157	4,023	4,460	4,034
- Recycled MSW		1,075	2,374	2,629	2,778	2,567
- Composting			783	1,394	1,682	1,467
MSW diversion rate (%)		13%	32%	38%	41%	42%
Construction waste (short tons)				10	0	1,589
Diverted construction waste (short tons)				4,038	93	168,526
Construction diversion rate (%)				99.8%	100%	99.1%
Hazardous Waste (tons)		801	341	152	138.5	n/a
Transportation						
Fuel usage – commute and fleet (gallons)	3,118,671	3,009,282	2,829,705	2,571,443	2,459,121	2,222,294
Vehicle miles traveled – commute	59,216,106	58,170,774	54,990,752	52,807,839	50,661,749	45,407,467
Vehicle miles traveled – fleet				2,284,422	2,075,851	2,132,149
Drive alone rate, faculty/staff (%)	60.0%	54.6%	50.2%	47.1%	47.1%	43.1%
Drive alone rate, students (%)	10.7%	11.8%	8.2%	8.0%	7.1%	7.1%
Green fleet (%)				5.7%	10.9%	17.8%
Air travel (miles)				116,394,265	116,892,152	110,519,178
Food						
Total sustainable purchases (%)				18.9%	24%	26.8%
Other						
Population	44,120	43,509	45,565	49,138	49,567	50,013
Gross Square footage	12,817,517	13,520,471	14,145,728	15,675,971	15,986,234	16,297,576
Research	\$309,755	\$333,613	\$415,408	\$437,629	\$480,213	\$514,059

Sources and Changes from Previous Reports: Annual Sustainability Metrics

Sources: All data from 2009 CalCAP inventory (July 8, 2010 version) unless otherwise noted (<http://calcap.berkeley.edu>). Most waste data is from Campus Recycling & Refuse Services.

Greenhouse gases: “Total greenhouse gas emissions” (the basis for the campus reduction goal) includes Scope 1,2,&3 emissions. “GHG Scopes 1&2” includes direct and indirect emissions (and excludes optional, or Source 3, emissions sources). Changes include corrected refrigeration emissions and the inclusion of Albany Village for years 2007-2009.

Electricity: Change due to the inclusion of Albany Village for years 2007-2009. Inclusion of newly purchased buildings also changed 1990 baseline.

Natural gas: Change due to the inclusion of Albany Village for years 2007-2009. Inclusion of newly purchased buildings also changed 1990 baseline.

Renewable energy: Onsite renewable energy (kW) represents a photovoltaic installation on the student union

Utility-provided electricity (% renewables): The percentage of electricity sourced from renewable energy by our utility provider(s). 1995 is assumed to be the same fuel source distribution as 1990.

Water and Wastewater: Changes reflect corrected data from the utility. Data does not currently include residence halls.

LEED™ buildings: Gross square footage for certified buildings from Facilities & Spatial Data Integration at UC Berkeley (FASDI), <http://www.fasdi.berkeley.edu>

Municipal solid waste (MSW): All waste sent to a landfill, excluding construction, demolition, and hazardous.

Diverted MSW: Includes recycled, reused, and source-reduced MSW and composting.

MSW diversion rate: The percentage of all MSW that was diverted from a landfill, on a calendar year basis. Previous reports included diversion rates for academic years and sometimes included construction waste in the calculations.

Construction waste/Diverted construction waste: Waste sent to a landfill/diverted from a landfill from construction and demolition sources. Waste from some construction projects may not be included. Not reported or not reported separately until 2007.

Construction diversion rate: The percentage of construction waste that was diverted from a landfill, on a calendar year basis. Not previously reported separately. This includes waste from some general campus operations of a C&D type.

Hazardous waste: Variations in hazardous waste due to construction projects. Source: Multiple EH&S Hazardous Waste Source Reduction and Management Reviews. 2009 data is not yet available.

Fuel usage: Includes gasoline for commutes; includes gasoline, diesel, and biodiesel for fleet.

Vehicle miles traveled – fleet: Includes all fleet and shuttle vehicles.

Drive-alone rates: Determined through campus surveys every three years.

Green fleet: Includes categories of vehicles as defined in the Energy Policy Act (various) plus hybrid vehicles. Source: Fleet Services.

Total Sustainable Food: Data from Cal Dining only; purchases from additional campus foodservice vendors will be included in future years. Includes purchases that are local, organic, fair trade, or humane.

Population: Includes students, faculty, and staff. Faculty and staff are in full-time equivalent (FTE).

Gross Square footage: Number for 1990 is assumed to be the same as for 1991. Data represents Basic Gross Area for UC Berkeley-owned space. Source: FASDI, <http://www.fasdi.berkeley.edu>

Research: Thousands of research dollar expenditures, in constant 2009 dollars (converted using CPI). Data are reported in the starting year of the fiscal year (e.g., FY 2008-2009 is reported as 2008); 2009 data is preliminary. Source: Controller’s Office, Schedule 1-B <http://controller.berkeley.edu/FINRPTS/FinancialSchedules.htm> and personal communications.

Across Campus

Current Conditions Definitions of sustainability can vary from the informal – “walking and recycling more” – to the more formal one adopted by the Chancellor’s Advisory Committee on Sustainability (see box). UC Berkeley currently works to be more sustainable in at least nine different areas,³ complemented by numerous cross-cutting and administrative measures. These measures – campus committees, grants, communication tools, reports, and other similar initiatives – are a vital part of any sustainable institution and help define the culture of sustainability at UC Berkeley.

sus.tain’a.bil’i.ty n.

the ability to meet the needs of the present while living within the carrying capacity of supporting ecosystems and without compromising the ability of future generations to meet their own needs

– Chancellor’s Advisory Committee
on Sustainability

Across Campus At A Glance

- ✓ The [Chancellor’s Advisory Committee on Sustainability](#) (CACS) was formed in 2003 and promotes environmental management and sustainable development on campus. Membership is drawn from faculty, staff, students, and alumni.
- ✓ CACS hosts an annual Sustainability Conference, presents annual [Sustainability Awards](#), and funds the [Chancellor’s Green Fund Grants](#) and [CACS Internships](#).
- ✓ In 2009, the campus adopted its [2009 Campus Sustainability Plan](#) to define a vision of long term sustainability and describe steps being taken to achieve the vision.
- ✓ The [Office of Sustainability](#) – created in 2008 – publishes the [Bright Green News](#) newsletter, offers a sustainability tour, plans [Sustainability Forums](#) for student groups, and hosts four websites and a Facebook [page](#).
- ✓ In addition to the Office of Sustainability’s two full-time staff, there are several additional staff who work on sustainability-related issues, including energy efficiency, green buildings, grant coordination, and recycling.
- ✓ [The Green Initiative Fund](#) (TGIF) is a grant-making fund for sustainability projects on UC Berkeley’s campus. The referendum on the fund was passed by the students during the April 2007 ASUC elections with 69% approval and will continue until 2017.
- ✓ The [ASUC Sustainability Team](#) organizes the campus Earth Week, and multiple entities on campus regularly hold events during that time.
- ✓ Recreation Sports writes a PlayGreen [blog](#) and holds an annual [PlayGreen Festival](#).
- ✓ Sustainability information is shared with new students, faculty, and staff.
- ✓ There are seven (7) [Alameda County Green Businesses](#) on campus.
- ✓ The Vice Chancellor for Equity and Inclusion is charged with implementing the campus Strategic Plan for Diversity, Equity, and Inclusion ([Pathway To Excellence 2009](#)).
- ✓ UC Berkeley is a member of the [East Bay Green Corridor Partnership](#), which is committed to strengthening the regional green economy while reaching sustainability goals.

³ Energy and Climate, Water, Built Environment, Waste, Purchasing, Transportation, Food & Housing, Land Use, and Academics & Learning by Doing.

2009-2010 Features

The campus talks louder about sustainability Expanding the culture of sustainability at UC Berkeley requires improving access to information on an on-going basis, educating a broad range of community members, and empowering people to take positive action. The Talking Louder about Sustainability campaign run by the [Office of Sustainability](#) and funded by [TGIF](#) continues to turn up the volume, to engage more people in environmental improvements, and to build a culture of sustainability at UC Berkeley. The Office redesigned three websites, and the **bright green news** went from a subscription base of 400 to 1,400 as a result of the campaign, representing a 250% increase in readership. We also offered two student sustainability forums each semester, where attendance grew by over 400% and the number of student groups presenting also doubled from last year.

Earth Week 2010 For the 40th anniversary of Earth Day, UC Berkeley expanded its normal Earth Week to [eight days of activities](#), in part through [TGIF](#) funding. Events included a discussion on corporate social responsibility, a Memorial Glade Picnic with food from the Berkeley Student Food Collective, the 7th Annual Campus Sustainability Summit, and a Strawberry Creek clean-up. UC Berkeley was one of eight campuses to partner with the Save My Oceans Tour that same week to hold a series of music, film, and art installations that celebrated oceans and provided tools and information on how to protect them. Events started with a Cold War Kids Concert, in collaboration with SUPERB, and also included a sea creature art installation created out of plastic bottles (hosted by the ASUC Sustainability Team) and an advance screening of *Oceans*, a new film about seeing the oceans of the world and saving them (in association with the Chancellor's Advisory Committee on Sustainability).

Green Departments and Events To date, there have been nine certified **green departments**, representing at least 10% of the campus staff and faculty. In order to be certified, departments have achieved at least ten points for actions ranging from using 100% recycled content copy paper to conducting appliance audits to installing hydration stations to discourage bottled water usage. Facilities Services became the first campus operating unit to be fully green-certified. The Office of Sustainability has also certified 25 **green events** in the past year, which were attended by around 13,000 people. Event planners have flexibility in the steps they take to be certified, but 72% chose to offer composting and 60% offered at least 10% sustainable food.



Interesting Fact Through lectures, tabling, tours, roundtables, forums, and meetings the Office of Sustainability talked sustainability with over 7,600 faculty, staff, and students in the last 18 months.

Energy & Climate

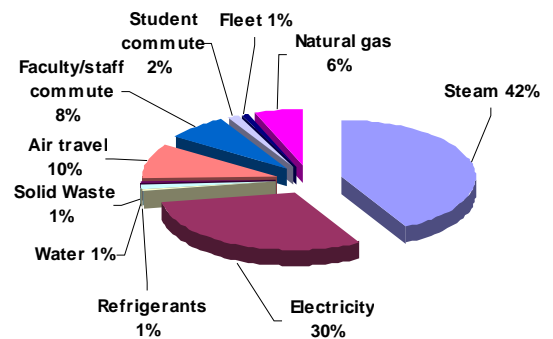
Current Conditions In 2009, **campus greenhouse gas emissions were down by 4.5%**, over 9,500 metric tons CO₂ equivalent (CO₂e) lower than in 2008 and the lowest level since 2005⁴. Due to energy efficiency projects in campus buildings, emissions per square foot decreased by 6.3%. Emissions were down in all of the five largest source contributors to the inventory: steam, electricity, air travel, faculty/staff commute, and natural gas. Total natural gas usage is down 0.8%, and usage per square foot has also been declining since 2005. Based on the latest inventory, it is estimated that the campus needs to reduce emissions by a further 50,000 tons to reach 1990 levels and its 2014 target.

About half of the emissions savings came from electricity, and about 20% of the reduction was associated with the faculty/staff commute. While campus electricity use was up slightly in 2009, associated emissions were down 8% due to PG&E's power mix containing less coal and more natural gas in 2009 than the previous year. Electricity usage per square foot dropped 1.6% and has been declining since 2005. Emissions from steam decreased by about 1% or 850 metric tons CO₂e. The reduction in the faculty/staff commute emissions is due to a decrease in the surveyed drive-alone rate from 47% to 43%.

Energy & Climate At A Glance

- ✓ UC Berkeley has set an emissions reduction goal that exceeds California state law (1990 levels by 2014) and includes a commitment to climate neutrality.
- ✓ UC Berkeley maintains an inventory of Scope 1, 2, and 3 greenhouse emissions.
- ✓ Scope 3 emissions sources include commute, business air travel, solid waste, water, and purchases (calculated separately).
- ✓ UC Berkeley's [Cal Climate Action Partnership](#) (CalCAP) has identified energy saving projects that will reduce greenhouse gas emissions by about 30,000 metric tons CO₂e.
- ✓ Steam is purchased from an on-campus, natural gas fired, co-generation plant.
- ✓ The campus adopted a [Strategic Energy Plan](#) that identifies potential energy efficiency retrofit projects in all campus buildings over 50,000 square feet.
- ✓ An energy management system that controls ventilation, temperature, lights, and operating hours is used in 70 buildings on the main campus.
- ✓ Residence hall competitions to reduce electricity consumption and CFL exchanges are held each semester.
- ✓ The student-run [Berkeley Energy Resources Collaborative](#) (BERC) hosts an annual energy symposium.

Figure 1: UC Berkeley Greenhouse Gas Emissions by Source, 2009



80% Buildings
20% Transportation

⁴ More information on the 2009 and previous inventories is available at <http://calcap.berkeley.edu/>

Energy & Climate

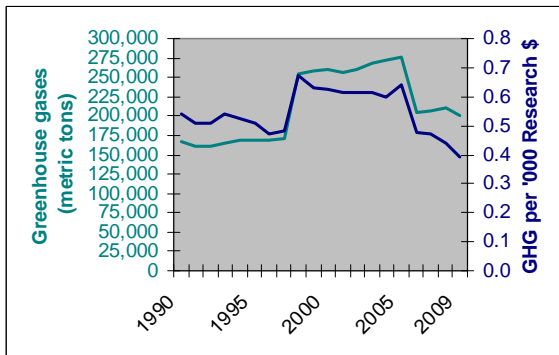
Figure 2: Energy Usage & Greenhouse Gas Emissions at UC Berkeley, 1990-2009

	1990	1995	2000	2007	2008	2009
Total greenhouse gases (metric tons CO ₂ equivalent)	166,600	169,849	259,601	206,897	210,632	201,110
- GHG Scopes 1&2	116,773	123,099	216,078	161,609	166,175	159,789
- GHG Scopes 1&2, per capita	2.7	2.8	4.7	3.3	3.4	3.2
Electricity (kWh)	157,105,948	171,709,091	185,666,952	212,243,455	217,841,461	218,515,767
Steam (MMBtu)	844,972	894,828	938,135	1,078,035	1,085,850	1,075,197
Natural gas (MMBtu)	156,301	162,123	155,331	227,764	221,141	219,401
Renewable energy (kW)				59	59	59
Utility-provided electricity (% renewables)	18%	18%	5%	13%	15%	14%

Greenhouse gases: "Total greenhouse gas emissions" (the basis for the campus reduction goal) includes Scope 1,2,&3 emissions. "GHG Scopes 1&2" includes direct and indirect emissions (and excludes optional, or Source 3, emissions sources). Per capita calculations include faculty, staff, and students.

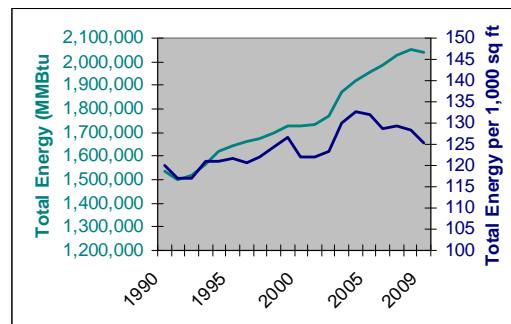
Renewable energy: Onsite renewable energy (kW) represents a photovoltaic installation on the MLK, Jr Student Union

Utility-provided electricity (% renewables): The percentage of electricity sourced from renewable energy by our utility provider(s). 1995 is assumed to be the same fuel source distribution as 1990.



GHG emissions are down 4.5%...
and emissions per thousand dollars of research expenditures have dropped by over 27% since 1990.

Total Energy Usage is Down Slightly (0.5%)...
although decline in usage per square foot is more significant, especially since 2005.



Energy & Climate Goals

- **By 2014, reduce greenhouse gas emissions to 1990 levels (CalCAP)**
- **Achieve climate neutrality as soon as possible (CalCAP, UCOP)**

Key Strategies:

1. Reduce systemwide growth-adjusted energy consumption by 10% or more by 2014 from the year 2000 base consumption level. (UCOP)
2. Work on UC system goal to provide up to ten megawatts of local renewable power by 2014. (UCOP)
3. Procure 20% of electricity needs from renewable sources by 2010. (UCOP)

Energy & Climate

4. Develop a campus standard for sustainable design specific to our site, climate, and facility inventory. (LRDP)
5. Update the *Campus Design Standards* and set a campus-wide energy policy.
6. Implement strategies and actions identified in the UC Berkeley *2009 Climate Action Plan* and future climate action plans.
7. By 2011, set next interim greenhouse gas emissions reduction target for 2020 or 2025.
8. Develop criteria for defining climate neutrality for the campus and a target date for reaching neutrality.

Plans As part of the Strategic Energy Plan, Facilities Services is installing real-time, internet - accessible power and thermal meters in most campus buildings for monitoring-based commissioning. Data collected by these meters is used to analyze building energy use and make energy saving changes to building operations. Having the meters in place also helps ensure persistence of the energy savings. Initial energy conservation measures will include straightforward items, such as schedule changes, and more complex projects, such as the installation of a new building control system or the repair of non-functioning building systems.

Other projects underway include collaborating with the Information Services and Technology Department on a project to add a low energy cooling system to the campus data center to reduce the energy required to mitigate the heat from the server racks; a collaboration with Parking and Transportation to install a carbon monoxide monitoring system in the Recreational Sports Facility garage to turn off the exhaust fans when they are not required; and a project to retrofit existing campus metal halide exterior lighting lamps with LEDs.

The Strategic Energy Plan also includes the retrofit of existing lighting in most rooms in most campus buildings. These projects include the installation of low energy ballasts, lamps, and fixtures and the installation of occupancy or daylight sensors to reduce operating hours of lights.

The campus will continue to explore new ways to reduce emissions, including a behavior-based energy management program through the [Operational Excellence](#) initiative that could bring additional emissions and cost savings. A [TGIF](#)-funded project will install energy sub-meters in five floors of Wurster Hall.

With guidance from the CalCAP Steering Committee, Facilities Services will take the lead on creating the first comprehensive campus energy policy to inform campus energy standards for new and existing buildings and conservation efforts. Continuing CalCAP work in the upcoming year will include:

- identifying sites and funding models for solar installations on campus buildings,
- continuing to research rising electricity use in central campus buildings,
- exploring a more aggressive fleet and commute fuel reduction target, and
- potentially supporting another graduate CalCAP seminar in spring 2011.

Interesting Fact *The Green Campus student program has installed 14 vending misers – equipment that reduces the energy consumption of soda and snack machines – with plans to add seven more this year.*

2009-2010 Features

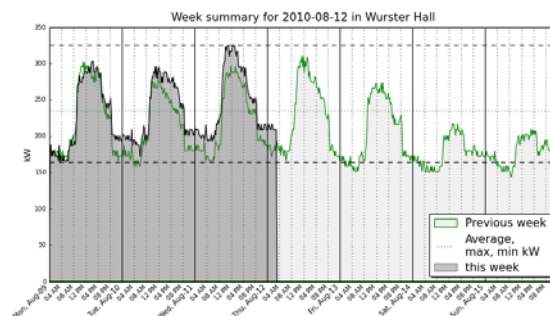
Campus Energy Efficiency projects save 11.5 million kWh Since 2006, the campus has funded multiple projects to reduce energy usage in new and existing campus buildings. As part of a partnership with PG&E, these projects are also expected to have saved close to 227,000 therms of natural gas annually, for an emissions reduction of about 5,000 tons and a cost savings of almost \$1.4 million. The projects are part of the campus [Strategic Energy Plan](#), which identifies potential energy efficiency retrofit projects at all campus buildings over 50,000 square feet. The Plan also addresses the potential for energy efficiency in new construction and renovated buildings.

CalCAP Course issues timely reports The spring 2010 CalCAP class consisted of eight graduate students from different departments across campus (including engineering, architecture, building science, business, and policy). The students worked with researchers and staff on a variety of campus sustainability and climate-related issues. The students pursued individual research topics in more depth, investigating the potential costs and savings and evaluating case studies from other universities. Through this process, the class developed [three topical reports](#) – on energy efficiency, electric vehicles, and wastewater systems – along with recommendations of relevance to campus climate action and sustainability.

Award Winner

Professor Cris Benton Prof. Benton won a 2010 sustainability award because he has dedicated his accomplished career to the improvement of the energy and environmental performance of buildings, and truly “practices what he preaches.” Cris teaches a course that has inspired the work of many students called the Secret Life of Buildings, served as a faculty advisor on the TGIF grant-making committee, and has been a leader in Wurster Hall – helping students and staff to bring real and innovative sustainability projects to the building, including a recent building energy dashboard.

Campus Dashboard makes consumption visible Have you ever wondered how much energy and water are being used on campus? This question motivated a small group of Berkeley students to develop the [Berkeley Campus Dashboard](#). The Green Initiative Fund (TGIF) project uses a web-based system to collect, aggregate, and visualize data on energy and water use across campus. The Dashboard team headed by graduate students Sam Borgeson and Omar Khan designed the platform to help visualize the amount of energy used on campus. The Dashboards can be seen at the Free Speech Movement Café and in the lobby of Wurster Hall.



Winter break closure reduced energy usage Heating and ventilation were curtailed on campus during the winter closure period (2009-2010). Physical Plant-Campus Services was responsible for turning off central heating and ventilating systems, and while normal electric service was maintained, the campus community was encouraged to turn off equipment and lights to conserve electricity. The campus estimates that 1.3 million kWh of electricity and 100,000 therms of steam were saved, for costs savings of over \$200,000.

Energy & Climate

Discounted Refrigerators also save energy In the fall of 2009, the campus implemented a pilot program where 100 refrigerators were offered on a first-come, first-served basis at a steep discount (almost 50% off), as part of campus-wide efforts to reduce energy usage and costs. Departments were able to apply for a new, Energy Star refrigerator to replace an existing, inefficient one. Applications for 65 replacement refrigerators were received from over 40 departments representing almost every campus control unit. At the end of the program, which was run through Business Services and Capital Projects, a total of 46 refrigerators had been replaced. The central campus provided \$12,650 to departments to subsidize the purchase and will receive a rebate of \$4,400 from PG&E. With the expected electricity savings of \$4,750 annually in energy costs, the initiative has a campus payback of well under two years.

Staying wired to Green Computing Have you ever thought about all the computers that are on campus? [Green Computing](#) is an effort to raise awareness about energy usage – and possible reductions in usage – associated with information technology. Berkeley's Green Computing initiative is overseen by the Office of the Chief Information Officer (CIO). There are many green computing efforts already taking place on campus, including "Turn Off Lights" stickers, a monitor replacement project, and an effort to use software to customize energy settings for desktops.

Award Winner

LeConte Hall The monitoring-based commissioning of LeConte Hall (part of the Strategic Energy Plan) received a 2010 Best Practice Award from the California Higher Education Energy Efficiency Partnership. It was selected because of a number of outstanding features including the large percentage of base energy savings observable at the on-line building meter, the degree to which the savings were based on meter data (rather than calculations), and the inclusion of staff training. All three of these factors contribute to the persistence of the energy savings. The expected savings from the optimization, leak repair, and other upgrades that were part of the commissioning include a 350,000 kWh reduction in electricity use and a reduction in greenhouse gas emissions of 171 metric tons of CO₂ equivalent.



Wireless Sensors help Data Center boost efficiencies by 20% To offset an anticipated increase in server racks and power usage in the campus data center, a wireless, sensor-based monitoring system was installed. According to a report by [NetworkWorld](#), the system collects about 160 measurements of power and thermal conditions in the 10,000 square foot space. The system may be expanded later this year due to the success so far: the sensors have increased the efficiency of the data center by 20%.

More people donating to campus efforts The [Climate Action Fund](#) continues to increase donations to the campus effort to reduce greenhouse gas emissions. As part of the registration process, the BERC 2010 energy symposium offered participants the opportunity to lessen the impacts of their travel to the event by donating \$5 to the Fund – raising \$300 in total for new behavioral projects on campus.

Interesting Fact *To date, the Green Campus student program and the Residential Sustainability Program have given away 7,047 CFL lamps to incoming students.*

Water

Current Conditions Total campus water usage (not including residence halls) **dropped by 1.2% last year** and has dropped by almost 20% since 1990. More notably, usage per capita has dropped by almost 30% since 1990. Much of this improvement can be attributed to the increased efficiency of irrigation, implementation of building codes related to low-flow fixtures, and improvements during building renovations. Recent research indicates that approximately half of current usage is domestic (toilets, urinals, showers, and faucets), divided equally between residence halls and all other campus buildings.

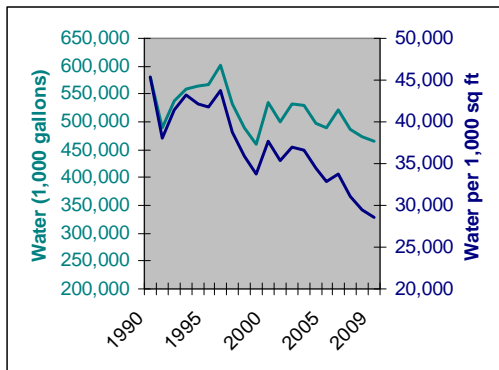
Water At A Glance

- ✓ The Chancellor's Advisory Committee on Sustainability has a draft [feasibility study](#) of possible water conservation projects.
- ✓ New construction and major renovation projects will maximize the number of water use reduction credits as part of the LEED™ certification process.
- ✓ In recent years, the campus has installed 23 state of the art water meters and will install eight more next year in conjunction with a student team.
- ✓ Over 90% of irrigation systems are automated and connected to a weather station.
- ✓ There are three hydration stations on campus to refill water bottles with greater ease.
- ✓ The Campus implements Stormwater Pollution Prevention Plans for all campus construction projects to manage stormwater runoff and protect water quality.

Figure 3: Water Usage at UC Berkeley, 1990-2009

	1990	1995	2000	2007	2008	2009
Water (millions of gallons)	581.2	566.2	533.5	487.4	472.0	466.3
Water per capita (gallons)	13,173	13,013	11,709	9,919	9,523	9,324
Wastewater (millions of gallons)	418.8	388.8	359.4	342.1	326.0	330.4

Water and Wastewater: Data does not currently include residence halls.



Water Use Dropped in 2009 by 1.2%... and usage per square foot has dropped by over 36% since 1990.

Water Goal

By 2011 or earlier, set a water reduction goal and analyze and approve feasible water reduction, reuse, and/or recycling projects

Key Strategies:

1. Convene a steering committee composed of faculty, staff, and students to conduct a feasibility study and an analysis of possible projects and targets.
2. Identify and implement cost-effective water projects, especially those that also reduce campus energy use.
3. Include at least two Water Efficiency Credits as mandatory credits for new construction projects.

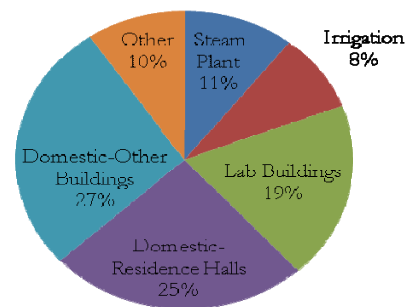
Plans The Chancellor's Advisory Committee on Sustainability will complete the research on campus water usage begun last year, by adding data on historical residence hall water usage and further evaluating the feasibility of water efficiency projects. On the basis of a survey of 185 bathrooms in 27 campus building in fall 2009, PPCS will install low-flow faucet aerators on approximately 600 sinks.

There are other water projects also underway on campus. One TGIF grant will install water meters in eight campus buildings and increase water conservation publicity and education. The ASUC and Capital Projects are currently developing design guidelines for water bottle refilling (or hydration) stations and will install two stations in the Martin Luther King Jr Student Union and Dwinelle Hall.

2009-2010 Features

Research sheds light on Campus Water Usage California recently passed water conservation legislation, which calls for a 20% conservation mandate for urban areas and increased measures to protect area water resources. Concerns about the drought and possible future rationing or price increases prompted the Chancellor's Advisory Committee on Sustainability ([CACS](#)) to commission a [report on campus water usage](#). CACS sought to better understand baseline campus water consumption and identify areas of opportunities for conservation, with a focus on domestic and industrial use of potable water in campus buildings. Joanna Zhang, a senior Industrial Engineering and Operations Research major, conducted the research.

The **study results** are interesting. The campus currently spends approximately \$4 million on water and sewer fees. The CACS report found that about half of the water consumed in 2008 (see graph) was domestic (toilets, urinals, showers, and faucets), divided equally between residence halls and all other campus buildings. About one-fifth of usage was in lab buildings (excluding their domestic usage), with irrigation and the steam plant each using about 10% of the total. To put these percentage in perspective, the campus currently uses just over 660 million gallons per year (including residence halls), an average of 35 gallons per person each day.



Water

But how easily can we make further reductions? The research team looked at various **water conservation opportunities**. They found that a \$1.5 million investment could fund seven projects that would reduce water usage by around 8% and save the campus \$240,000 per year. They also identified other possible savings from reducing usage in residence halls by changing behavior and installing new equipment like lower-flow shower heads. The estimate presented of these possible water savings – an additional 16 million gallons – is based on anecdotal evidence that each resident showers for 20-30 minutes per day, and could bring the total reduction in water usage to over 10%.

Award Winner

I Heart Tap Water [I Heart Tap Water](#), a partnership between Cal Dining, Recreational Sports, Environment, Health & Safety (EH&S), and University Health Services, received one of the 2010 Sustainability Awards. The campaign promotes tap water as the preferred beverage of choice and educates the campus through a website, Facebook, posters, and an on-line pledge to make a difference. Key to the success of I Heart Tap Water was the testing of over 450 water fountains to allay concerns about water quality. The group's efforts have so far reduced campus usage of plastic water bottles by at least 25%.

Further reductions in bottled water Plenty of clean water flows to faucets and spigots throughout the UC Berkeley campus every day, sourced from Sierra Nevada snowmelt and processed by East Bay Municipal Utility District. But people on campus still consume bottled water. The College of Engineering Dean's Office is one of many departments to join the I Heart Tap Water campaign and eliminate bottled water, along with Physical Plant Campus Services and California Hall. The goal of the campaign is to convince the campus community that tap water is better than bottled for our health and the environment. Cal Dining's promotion of tap water has reduced their bottled water sales by 28%. The ASUC also passed [legislation](#) banning any student funds being spent on bottled water.

40% water reduction after Clark Kerr Campus renovation Compared to baseline building and occupant models, post-renovation water consumption in the Clark Kerr Campus Renewal Phase 1 buildings has been reduced by 40%. This has been achieved through the selection of water efficient fixtures such as dual flush water toilets in dormitories and in suites, 0.5 gpm lavatory faucets, 1.5 gpm showerheads, and 1.5 gpm kitchen faucets. In addition to the reduction in building water usage, the project incorporated landscape features that reduce the need for irrigation, a retention basin that receives stormwater from adjacent landscaping, pervious pavement, roof leaders, and an upgraded storm drain system. Most of these features will be replicated in the second Phase of the renovation.

New Bottle-less Water Coolers at Haas The typical water cooler uses large plastic bottles of water that are transported by trucks. At the Haas School of Business, there is a water cooler that is bottle-less and thus uses less energy and resources. Gerardo Campos, the facilities and building operations manager for Haas, recently retrofitted several water coolers by directly piping water from the sink to the dispensing unit. Without large plastic bottles, the water cooler still serves filtered water that is able to be chilled or warmed and saves Haas about \$200 a month.

Quotable *"We ultimately should have goals for water conservation that are commensurate with the goals we have already established for carbon production."*

Chancellor Birgeneau, April 21, 2010

Built Environment

Current Conditions In 2009-10 the **campus continued to increase our commitment to green building practices as the second campus project achieved LEED™ certification:** the Clark Kerr Campus Phase 1 Renewal (Gold, Commercial Interiors). In addition, all major projects currently in the planning and design phase, as well as several projects now in construction, are registered with the Green Building Certification Institute and are expected to be LEED™ certified. To support this commitment, Capital Projects is working to provide the administrative structure and tools to continue integrating green building practices into campus processes. Examples include extending the campus “No Smoking” policy from a 20’ limit to a 25’ limit to align with the LEED™ standard, and adding a user survey process to the campus ergonomics program to meet the eligibility for recognition as an Innovation in Design credit.

Campus construction projects generally follow the U.S. Green Building Council Leadership in Energy and Environmental Design (LEED™) system for green building performance, and major projects are designed to be equivalent to LEED™ Silver. For laboratory construction and renovation, campus designers consult the Labs 21 performance criteria. New building and major renovation projects are required to outperform local energy codes by at least 20%, and routine and smaller renovations are required to conform to energy codes and to apply energy efficiency principles, budget and program permitting. Though not mandated, the campus encourages innovation in specific projects around the use of low-flow plumbing fixtures and use of weather sensitive irrigation systems. As a result, most construction projects readily achieve credits in the Water Efficiency category.

The campus received almost \$256,000 between 2009 and 2010 from PG&E, the local utility that administers the Savings by Design program. Projects presently in design and under construction are expected to generate an additional \$848,000 from Savings by Design over the next several years.

Build Environment At A Glance

- ✓ UC Berkeley has one Silver certified LEED™ building (New Construction – Haste Street Child Development Center), and one LEED™ Gold certified (Commercial Interiors – Clark Kerr Campus Phase 1 renovation). There are an additional 13 campus building projects that are registered to achieve certification, including Morgan Hall, the first laboratory renovation project on campus.
- ✓ As of 2010, there are at least ten LEED™ accredited professionals on campus. Several members of the campus community, including both students and staff, are actively pursuing LEED™ EBOM professional accreditation; as of July 2010 at least one student and one staff have achieved this.
- ✓ Indoor air quality questions and complaints are handled by a full-time industrial hygienist.

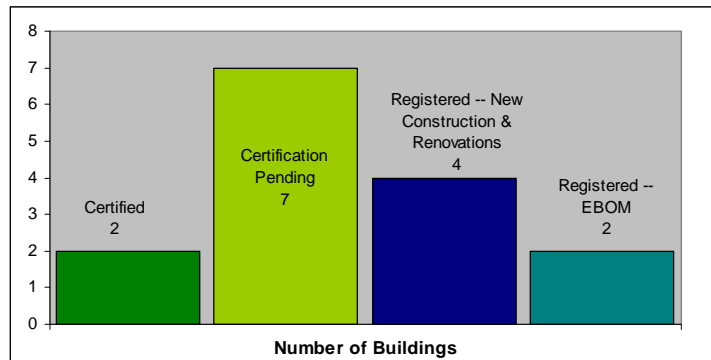
Figure 4: Green Buildings at UC Berkeley, 1990-2009

	1990	1995	2000	2007	2008	2009
LEED™ buildings (#/square footage)					1 / 11,068 ft ²	2 / 112,042 ft ²

LEED™ buildings: Gross square footage for certified buildings from Facilities & Spatial Data Integration at UC Berkeley (FASDI), <http://www.fasdi.berkeley.edu>

Built Environment

Campus has two LEED™ certified building projects and 13 more in various stages of planning or construction.



Built Environment Goals

- **Design future projects to minimize energy and water consumption and wastewater production (LRDP)**
- **Incorporate sustainable design principles into capital investment decisions (LRDP)**
- **Base capital investment decisions on life cycle cost, including the cost of known future expenditures (LRDP)**

Key Strategies:

1. All new building projects [will] outperform the required provisions of the California Energy Code ([Title 24](#)) energy-efficiency standards by at least 20%. (UCOP)
2. Design and build all new buildings to a minimum standard equivalent to a LEED™ V.3 Silver rating, and strive to achieve a standard equivalent to a LEED™ Gold rating or higher, whenever possible within the constraints of program needs and standard budget parameters. (UCOP)
3. Design and build all new laboratory buildings to the same LEED™ standard and/or the Laboratories for the 21st Century (Labs21) Environmental Performance Criteria (EPC), as appropriate. (UCOP)
4. Large renovation projects [as defined by UCOP] should at minimum comply with UC equivalent to LEED™ Commercial Interiors or New Construction certified rating and register with Savings by Design program. (UCOP)
5. Submit one pilot building for LEED™ Existing Buildings certification.
6. Include at least two LEED™ Water Efficiency Credits as mandatory credits for new construction projects.
7. Investigate the Volume Certification approach to LEED™ Existing Buildings.
8. Maximize use of monitoring-based recommissioning as a tool to reduce building energy use.

Plans Capital projects (new construction and major renovations) are designed to be able to achieve certification using the LEED™ system, while smaller projects have the option to pursue certification or to follow selected green building practices. Almost all the major projects (> \$10M) now in design or construction at the Berkeley campus plan to achieve LEED™ certification, performance not yet required by the "[Policy on Sustainable Practices](#)" but expected to be put into effect at the next policy update, anticipated in October 2010.

Built Environment

For renovation projects below the threshold of the system-wide policy (renovations that do not replace 100% of the building systems), the campus does not presently monitor energy code compliance; however, it is beginning an effort to track energy performance for these projects. This includes strategies for improved documentation and transparency of performance expectations and accountability.

Physical Plant Campus Services (PPCS) is working on campus-wide, volume certification of certain LEED™ credits (for Existing Buildings, Operations, and Maintenance). They have completed documentation for three credits and plan to document at least five more credits in collaboration with other departments on campus. Some of these credits, including Green Cleaning and Integrated Pest Management, have already been recognized to meet the LEED™ requirements. PPCS also plans to offer a second set of Commissioning training for staff, building managers, and project managers in the fall of 2010. The first training, which started in the spring of 2009, covered commissioning opportunities, HVAC fundamentals, filtration pump theory, systems and testing, fan theory, systems, and economizers.

2009-2010 Features

Clark Kerr Renovation Achieves LEED™ Gold Certification Finished in 2009, Phase 1 of the Clark Kerr Campus (CKC) Renewals project makes the residential building a campus frontrunner in sustainable renovations and the first project on campus to achieve Gold certification under Leadership in Energy and Environmental Design for Commercial Interiors (LEED™-CI). Sustainable features of the project include new bike storage, low-emitting project materials, and a 75% diversion rate of construction waste. The project also features green roofs, use of “no-mow” grass, and the development of a retention basin to store site water run-off. Phase 2 of the renewal project is now underway and is on target for Gold certification as well. Photo Credit: Diane Mayo



Award Winner

Rebecca Anderson Rebecca Anderson, an Environmental Specialist in [EH&S](#) (Environment, Health & Safety), won a 2010 Sustainability Award for going beyond compliance and striving to help Cal achieve sustainability in its operations and to be an example for other institutions to follow. She is a founding member of University Hall's Sustainability Committee, is active in the campus effort to bring LEED™ certification to existing buildings, works with Building Sustainability @ Cal students, and founded the Green Building Working Group. Rebecca brings enthusiasm and expertise to whatever she does and energizes others to take action.

Multi-department working group tackles how to green existing buildings The campus has a Green Building Working Group that meets regularly to share knowledge and best practices with respect to green building performance for existing buildings, operations, and maintenance. This work is overseen by campus PPCS staff. Support toward campus sustainability efforts in existing buildings is also provided by Building Sustainability @ Cal students, who do projects and support departmental efforts to improve sustainable practices on campus. Students have contributed to several specific LEED™-EBOM tasks, including waste, energy and water audits, educational and outreach projects to explain green building features to new occupants, and campaigns for energy conservation.

Built Environment

How to have a green, historic campus? The Berkeley campus has a long history of valuing environmental performance and historic preservation. However, with the plethora of historic buildings and the acres of lawn areas, the visual and historic character of the campus is intrinsically connected to historic elements that may not have as high an environmental standard as new technologies and innovations permit. Finding ways to balance these values is an emerging challenge. The campus continues to seek input and dialogue on project design decision-making in order to achieve a thoughtful balance of environmental, visual, cultural and historic values.

In terms of materials use, the Berkeley campus has long emphasized preservation of existing building stock that has a historic and cultural value. While preserving existing building materials does not always meet the ambitious targets established to achieve a LEED™ credit, the campus pursues this as a reflection of the waste reductions goals, as well as to maintain/retain the unique historic character of the campus buildings and grounds. The recently completed Durant Hall renovation project exemplifies this, as the project retained historic forms and building fabric to meet its preservation goals and the direction from the State Office of Historic Preservation, but the efforts did not receive credit through LEED™ because of the methods used to apply a commercial value to the historic material.

Campus strives to institutionalize building green Besides those listed above, there are numerous campus practices that are recognized as green by the U.S. Green Building Council:

- Selecting building sites that are well-located/proximate to services and transportation/transit
- Implementing Best Practice requirements for stormwater management
- Preserving specific landscape materials and specimen trees, open space and natural habitat
- Providing bicycle parking as part of campus building projects
- Remediating sites and buildings locations where hazardous materials are present to enable reuse of the land or building
- Minimizing/limiting parking provided with new buildings
- Implementing building commissioning for campus projects that improve building mechanical systems
- Requiring low VOC emitting materials for building materials
- Codifying waste minimization and diversion standards for project contractors.

Interesting Fact *The student-run [Building Sustainability @ Cal](#) program has developed sustainability plans for at least 25 campus buildings.*

Waste

Current Conditions The amount of **municipal solid waste sent to landfills by the campus dropped by 12%** in 2009, while per capita waste has dropped by almost 30% since 1990. The campus policy to increase diversion of construction and demolition waste has been successful, although the number and scope of such projects varies from year to year. The diversion rate for municipal solid waste is 42%, while the construction waste diversion rate (using the data currently available) is around 99%. Hazardous waste generation has declined for a second straight year, dropping to 9% less than in 2007.

Waste At A Glance

- ✓ The campus currently [recycles](#) mixed paper, newspaper, magazines and books, cardboard, beverage containers, toner and ink jet cartridges, electronic waste, plastic film, plastic pipette containers, metal, motor oil, tires, and batteries. The campus currently [composts](#) food waste, compostable kitchenware, green and wood waste, and pallets.
- ✓ The campus also works to reuse office supplies, equipment, and vehicles through the [Overstock and Surplus Den](#).
- ✓ The student-managed [ReUSE](#) program (which includes an on-line exchange) operates 16 on-campus reuse stations for office supplies, and runs the annual Second Chance clothing sales and Reader giveaways.
- ✓ Construction contracts include a requirement that waste must be tracked and that there be a 50% minimum diversion rate.
- ✓ The campus has a hazardous waste and waste minimization plan that includes e-waste.
- ✓ The campus no longer prints a phone directory, maintaining only an on-line version.
- ✓ The College of Chemistry runs an exchange that traded 1,244 chemical items last year.

Figure 5: Solid Waste at UC Berkeley, 1990-2009

	1990	1995	2000	2007	2008	2009
Municipal solid waste (MSW) (short tons)	6,973	7,187	6,637	6,689	6,417	5,675
Diverted MSW (short tons)		1,075	3157	4,023	4,460	4,034
- Recycled MSW		1,075	2,374	2,629	2,778	2,567
- Composting			783	1,394	1,682	1,467
MSW diversion rate (%)		13%	32%	38%	41%	42%
Construction waste (short tons)				10	0	1,589
Diverted construction waste (short tons)				4,038	93	168,526
Construction diversion rate (%)				99.8%	100%	99.1%
Hazardous Waste (tons)		801	341	152	138.5	n/a

Waste data is from Campus Recycling & Refuse Services.

Municipal solid waste: All waste sent to a landfill, excluding construction, demolition, and hazardous waste.

Diverted MSW: Includes recycled, reused, and source-reduced MSW and composting.

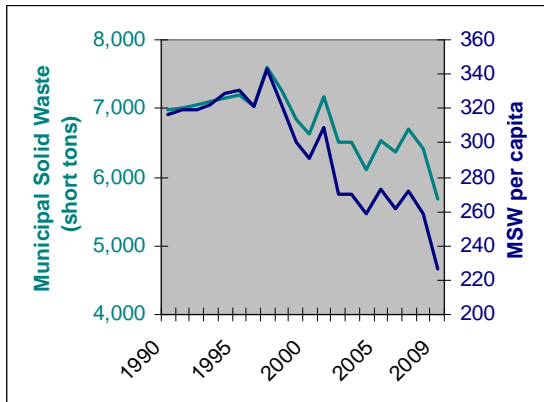
MSW diversion rate: The percentage of all MSW that was diverted from a landfill, on a calendar year basis.

Construction waste/Diverted construction waste: Waste sent to a landfill/diverted from a landfill from construction and demolition sources. Waste from some construction projects may not be included. Not reported or not reported separately until 2007.

Construction diversion rate: The percentage of construction waste that was diverted from a landfill, on a calendar year basis. Not previously reported separately. This includes waste from some general campus operations of a C&D type.

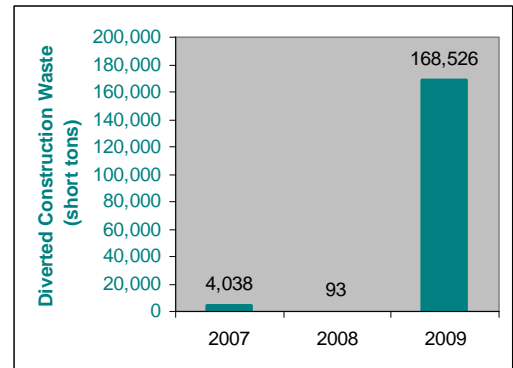
Hazardous waste: Variations in hazardous waste due to construction projects. 2009 data is not yet available. Source: Multiple EH&S Hazardous Waste Source Reduction and Management Reviews.

Waste



Municipal Solid Waste Dropped in 2009 by 12%... and waste per capita has dropped by almost 30% since 1990.

Waste Diverted from Construction and Demolition Projects varies from year to year.



Waste Goals

Achieve a 75% diversion rate by June 2012 and zero waste by 2020 (UCOP)

Key Strategies:

1. Fund and implement the CalCAP project to expand the campus composting program.
2. Continue to increase mixed paper recycling from campus buildings and recycling of construction/demolition materials.
3. Add more outdoor recycling and composting bins on campus grounds.

Plans There are numerous waste reduction projects planned for the coming year. One will purchase canvas bins to expand the program that collects and resells used clothing from residence halls. Another will develop a design/marketing campaign to create awareness in Kroeber Hall about sustainability and waste reduction. A third will fund a group of students to provide building audits and green event outreach on a case-by-case basis, with an emphasis on increasing composting. A final initiative, which will also work to increase composting at campus events, will provide a limited number of grants to cover the costs of composting through the **green events** certification process.

2009-2010 Features

Award Winner

Irene Seliverstov Irene was recognized as a 2010 Sustainability Award winner for her commitment to and passion for the environment and because she is a dedicated and enthusiastic leader. Her work is varied, including leading Building Sustainability @ Cal for a year, piloting a paper towel composting program, and working with our water provider and campus plumbers to install hundreds of faucet aerators to reduce water usage. She is also working with custodial staff and building inhabitants to create a positive relationship and address issues of social sustainability.

New Online Material Exchange increases reuse The student-run ReUSE program has created a self-sustaining, internet-based system in which students, staff, faculty, and departments can communicate directly with one another concerning reuseable materials. Users will have an opportunity to describe free items available for pick-up and is expected to be most convenient for exchanges of larger items like furniture, appliances, and larger office supplies. By eliminating double handling of large materials, ReUSE will reduce its use of fossil fuels and storage space. Facilitating direct contact between otherwise disconnected members of the campus will help to build community based on a unified goal of sustainability.



Fifteen tons of materials reused through “moving” effort The Marchant Building waste reduction partnership was a successful, innovative, and above all, collaborative effort to reduce waste in support of campus sustainability goals. The project established an intense student effort to triage a building full of surplus items and either find them new owners, adapt or transform them for new uses, or recycle them. With the deployment of a student-led team of seven ReUSE

Sustainability Specialists, this effort successfully diverted over eight huge truckloads of items – approximately 15 tons of materials – that were otherwise headed for landfill. The program success was made possible by a partnership between ReUSE and five campus administrative units. Photo credit: Trevor Bryant

eDissertations: Dissertations Go Digital Starting in spring 2010, UC Berkeley doctoral students began submitting their dissertations electronically. Students typically submit two copies of their dissertations, each of which is 300 pages on average. By going digital, it is predicted that Berkeley will save approximately a half million pages of paper each year. Berkeley normally accepts 800 to 900 dissertations each year, a figure that is greater than any other campus in the US. The switch to electronic filing will not only save paper, but will save staff time and shelf space in the Graduate Degrees Office and library.

Waste

Recycling Old Athletic Shoes The Recreational Sports Facility (RSF) now offers collection bins for athletic shoe recycling in their atrium near the vending machines. Obsolete sport shoes can actually help kids and fellow athletes. In partnership with the Bear Student Athlete Advisory Council (Bear SAAC), old sports shoes (running, tennis, basketball, etc.) will be collected and donated to a variety of charities, including the Nike Grind program, which grinds the shoes up and uses them to make playing surfaces all across the world.

ASUC Art Studio starts new reuse program The ASUC Art Studio, with funding from The Green Initiative Fund (TGIF), has installed two new closed-system sinks that collect the clay and glaze waste that previously was washed down the drain. These materials are recycled into new pots and other items for sale. The reuse of clay and glaze is not the only benefit to the campus – the reduction of sediment in the waste water alleviates some of the wear and tear on campus infrastructure. The Art Studio reclaims 15 gallons of glaze and 300 pounds of clay during every six week session through this new system – enough material to make 100 small flowerpots. Three such pots were used to create the 2010 Sustainability Awards. The sale of recycled material items will fund other environmental projects within the Art Studio. Photo credit: Kira Stoll



Sutardja Dai launches composting program The Banatao Institute and the Building Sustainability @ Cal (BS@C) program recently launched UC Berkeley's first academic building-wide composting program in Sutardja Dai Hall. According to a waste audit conducted in fall 2009, 56 percent of Sutardja Dai's waste consisted of compostable food and packaging. The BS@C students have helped to incorporate environmental awareness into the building, by tabling to educate building occupants of the benefits of composting and awarding people with free fruit and raffle prizes.

Interesting Fact *Since 2000, ReUSE has diverted over 40,000 pounds of reusable material from the landfill, with an estimated value of over \$50,000.*

Purchasing

Current Conditions Of the \$6.1 million of green purchasing in fiscal year 2008-2009, approximately two-thirds were purchases of [Energy Star](#) and/or [EPEAT](#) certified electronics, and one-quarter were recycled content offices and other supplies. Some of the increase in reported green purchasing over previous years is due to improved reporting by suppliers. In the Strategic Sourcing program, sustainability factors are identified for commodity areas and are requested to be included in suppliers' bid proposals, then weighed as quality enhancements contributing to the basis for award of a contract to a winning supplier.

Purchasing At A Glance

- ✓ UC Berkeley participates in the system-wide Strategic Sourcing program that is responsible for the planned negotiation and management of [University-wide agreements](#), and the development and oversight of policies governing purchasing activities, materiel management, and equipment management. Strategic Sourcing also strives to incorporate environmentally friendly products and services.
- ✓ The University of California's "[Policy on Sustainable Practices](#)" includes requirements on preferential purchases of Energy Star equipment, recycled content products, and other third party certified green items, along with guidance on packaging waste and takeback programs.
- ✓ UC Berkeley has developed [Sustainable Copy Paper Guidelines](#).
- ✓ Procurement Services' Supplier Diversity Program promotes business relationships and contract opportunities for small, local, and diverse businesses wishing to provide goods and services to the University community.

Figure 6: Green Purchasing at UC Berkeley, 1990-2009

	1990	1995	2000	2007	2008	2009
Total green purchasing (\$)				\$1.5 million	\$6.1 million	n/a
Recycled paper purchases (% of total copy, fine, and computer paper purchases)				64%	74%	79%

Total green purchasing: Data from UCOP. Includes Energy Star, EPEAT, Green Guard, Green Seal, and recycled content from system-wide contracts only. Some green purchases may not have been included in this total due to inadequate reporting by some vendors. Data are for fiscal years. Data for FY 2009-2010 are not yet available.

Recycled paper: 2007 data from 4/07 – 3/08 for Office Max and Radstons; 2008 data from 6/08 – 5/09 for Office Max and Radstons; 2009 data from 7/09 – 6/10 for Office Max only. All data are based on cost, for paper with a 30% or higher post-consumer recycled content.

Purchasing Goal

By 2011, develop a green purchasing policy

Key Strategies:

1. Preferential purchase of Energy Star® appliances and equipment, with energy efficiency and conservation features enabled. (UCOP)
2. Standard of 30% post consumer waste (PCW) recycled content paper for office use and 100% PCW recycled content for uncut paper, including janitorial supplies. (UCOP)
3. Increase the procurement of other products with high recycled content. (UCOP)
4. Work to phase in Green Seal Products. (UCOP)
5. Purchase electronics products that have achieved EPEAT registration. (UCOP)

Purchasing

6. Minimize packaging waste. (UCOP)
7. Establish take-back programs for packaging of electronics and other products and give preference to take-back programs that are provided free of charge. (UCOP)
8. Establish green purchasing guidelines to provide needed information to campus buyers.

Plans Procurement Services is currently rolling out a new [eProcurement](#) system, BearBuy (an application supported by SciQuest), and will work to include and possibly highlight green features of products, using information from suppliers. This new procurement system will also reduce campus paper usage by processing documents like purchase orders and invoices electronically. Procurement Services also expects to finalize a set of preferred catering contracts, which will highlight those vendors that are green.

2009-2010 Features

Greener cleaning practices adopted by campus The Physical Plant sustainability staff completed documentation of a new Green Cleaning Policy that outlines sustainability criteria for cleaning products, supplies, tools, equipment, and practices at UCB. The policy was developed as part of an effort to promote healthy indoor air quality, increase occupant wellbeing and comfort, assure building cleanliness, and provide a safe environment for custodial staff. This is the first policy to be implemented as part of the campus-wide, volume certification of LEED™ credits. This is a major step toward more sustainable practices in new and existing campus facilities.

Rec Sports gets greener towels By switching to a [new detergent](#), Rec Sports now uses less water and energy to wash the towels used in the gym. Berkeley-based Vaska's herbal detergent has been recognized by the EPA as part of their [Safer Detergents Stewardship Initiative](#) for using surfactants that break down quickly to non-polluting compounds. In addition to protecting aquatic life, the new detergent is estimated to save Rec Sports over 400,000 gallons of water each year.

UCB Finalist in Staples Global EcoEasy Challenge Explosi-Divas, a team of undergraduate mechanical engineering students, were the runners-up in the Staples Global EcoEasy Challenge. The Challenge sought the next environmentally-preferable office product among university teams from around the world. After being named one of seven finalists for their Eco-Stapler, the team presented details of their mini-stapler made of green materials to a distinguished panel of judges. Their product was noted as being "light and functional" and an "ecoconscious alternative to the conventional stapler." Plus it has a captivating design. Photo credit: Business Wire



Easy and Inexpensive Phone/Web Conferencing UC Berkeley now has access to [telephone-based conference calling](#) with ReadyTalk. ReadyTalk offers competitive rates for reservationless (on-demand) audio conferencing with the option to simultaneously conduct web conferencing in order to add real time visual content to meetings. All that is needed to make meetings virtual is a telephone and a computer with internet access.

Interesting Fact *Another indicator of overall interest in green purchasing is the approximately 26.3% of office supply purchases from our main supplier containing recycled materials.*

Transportation

Current Conditions The campus goal of achieving a 25% reduction in fuel use from fleet and commute was met and exceeded (down 28.7% from 1990 levels). There has generally been a steady decrease in the campus drive-alone rates, with the rate for faculty and staff dropping this year by four percentage points (to 43%). Air travel was down this year by 5,000 trips. In addition, 100% of the fleet vehicles purchases this past year were green, bringing the green fleet to almost 18% of the total fleet.

Transportation At A Glance

- ✓ UC Berkeley offers a comprehensive package of programs to encourage the use of alternative transportation, with the goal of reducing traffic and parking demands and lessening the impacts on the environment. The [New Directions](#) program offers a suite of attractive alternative commute benefits to UC Berkeley faculty, staff, and students. The program offers universal bus pass programs, transit subsidies, discounted carpool parking pricing, pre-tax purchases, a regional ride-matching service, and a host of other benefits and incentives.
- ✓ 82% of faculty, staff, and students (combining the mode split rates below) commute by walking, biking, ridesharing, or public transit.
- ✓ The campus has completed most of high priority infrastructure projects identified in the [2006 Campus Bicycle Plan](#) and regularly participates in Bike to Work Day.
- ✓ The campus currently has 4,350 bike parking spaces, having recently added 650. This includes indoor storage in at least two buildings and four parking garages.
- ✓ The campus currently owns 557 fleet vehicles, of which 99 are considered green.
- ✓ UC Berkeley has a variety of car sharing services on or just adjacent to campus, including City CarShare, Zipcar, and Enterprise Rent-a-Car.

Figure 7: Transportation at UC Berkeley, 1990-2009

	1990	1995	2000	2007	2008	2009
Transportation						
Fuel usage – commute and fleet (gallons)	3,118,671	3,009,282	2,829,705	2,571,443	2,459,121	2,222,294
Vehicle miles traveled – commute	59,216,106	58,170,774	54,990,752	52,807,839	50,661,749	45,407,467
Vehicle miles traveled – fleet				2,284,422	2,075,851	2,132,149
Drive alone rate, faculty/staff (%)	60.0%	54.6%	50.2%	47.1%	47.1%	43.1%
Drive alone rate, students (%)	10.7%	11.8%	8.2%	8.0%	7.1%	7.1%
Green fleet (%)				5.7%	10.9%	17.8%
Air travel (miles)				116,394,265	116,892,152	110,519,178

Fuel usage: Includes gasoline for commutes; includes gasoline, diesel, and biodiesel for fleet.

Vehicle miles traveled – fleet: Includes all fleet and shuttle vehicles.

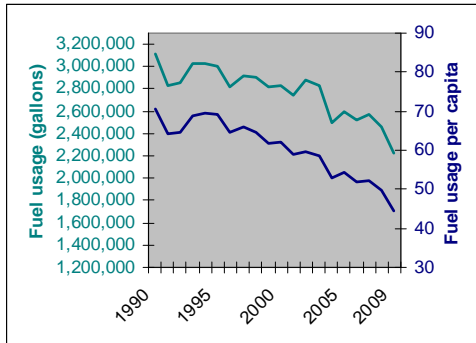
Drive-alone rates: Determined through campus surveys every three years.

Green fleet: Includes categories of vehicles as defined in the Energy Policy Act (various) plus hybrid vehicles. Source: Fleet Services.

Transportation

Figure 8: Alternative Mode Splits at UC Berkeley, 1990-2009

	1990/1992	2000/2001	2005/2006	2008/2009
Faculty and Staff	1990	2001	2006	2009
Walk	12.0%	8.4%	7.7%	9.0%
Transit	12.0%	17.8%	24.3%	25.2%
Bicycle	5.0%	9.5%	7.5%	9.1%
Rideshare	10.0%	9.1%	11.5%	11.8%
Other	1.0%	4.0%	1.9%	1.8%
Students	1992	2000	2005	2008
Walk	45.5%	53.5%	46.8%	54.9%
Transit	18.8%	23.0%	31.9%	24.2%
Bicycle	16.7%	8.7%	9.4%	10.8%
Rideshare	4.4%	1.8%	2.7%	1.9%
Other	3.9%	2.3%	1.2%	1.1%



*Fuel Usage Dropped in 2009 by 9.6%...
and usage per capita has dropped
by 37.1% since 1990.*

Transportation Goal

By 2014, reduce fuel use by commuters and campus fleet to 25% below 1990 levels

Key Strategies:

1. 25% of all fleet vehicles to be green by 2014. (CalCAP)
2. Reduce demand for parking through incentives for alternate travel modes. (LRDP)
3. Locate all new University housing within a mile or within 20 minutes of campus by transit. (LRDP)
4. Implement a program of strategic investment in campus pedestrian and bicycle routes. (LRDP)
5. Continue strategic bicycle access planning. (LRDP EIR)
6. Develop a strategic pedestrian improvement plan. (LRDP EIR)
7. Investigate initiatives to reduce greenhouse gas emissions from business air travel.

Transportation

Plans Parking and Transportation and Fleet Services will work with the Office of Sustainability to investigate ways to further reduce fuel usage from commutes and fleet vehicles between now and 2014. Parking and Transportation will be completing a study evaluating commute resource needs and programs for the campus. This study is intended to inform campus decision-making about future parking supply and transportation alternative programs and will offer strategies to make the commute and intra-campus travel more sustainable.

Fleet Services will continue to work towards the goal of having 25% of the fleet green by 2014; assuming current trends continues, they expect to meet or exceed this goal. Fleet Services will also be looking into an enhancement to the Enterprise daily/hourly rental car contract to have hybrids and ethanol vehicles (and possibly electric and low-speed electric) more readily available for rental at negotiated University pricing.

Two CACS grants will fund work to enhance the sustainability efforts around transportation. One will fund a portable videoconference systems to reduce business travel emissions, and a second will purchase pedestrian and bike counters to improve data on routing and safety.

2009-2010 Features

Fewer faculty and staff are commuting by car Based on 2009 survey information, 43% of faculty and staff now commute via driving - a decline of 4% since 2006. Bicycling increased 2%, some of which could be attributed to the new bike parking spaces added since 2008. The majority of walkers (85%) live within 2 miles of campus. Those taking transit were largely focused on the Region's two largest providers, BART and AC Transit. Two of the top reasons cited for driving continue to be convenience and travel time with many people stating a need for a car for "personal errands before, during, or after work." The survey was conducted in February and March 2010 and included all faculty and staff employed in the fall of 2009.

Bicycle Plan successfully increases ridership The campus has implemented – earlier than anticipated – most of the high-priority projects called for in the Campus Bicycle Plan, including adding over 650 new bike parking spaces, upgrading a major campus bikeway, and providing way-finding stencils and signing throughout the central campus. Recent transportation surveys reveal that the campus has already exceeded the bicycle commute goal set forth in the LRDP of increasing the number of bicycle commuters by 500 by 2020. Students have initiated several bicycle programs identified in the Campus Bicycle Plan including a [pilot bike-share and free bicycle maintenance](#). Photo credit: Kira Stoll



Transportation

The number of green fleet vehicles is rising The percentage of green vehicles in the campus fleet has nearly tripled since 2007, when the Office of Fleet Services enacted a rigorous review of department vehicle purchases. How did they accomplish this? For the past two years, Fleet Services has run a strategic outreach program targeting departments that they believe are suited to help achieve goals of acquiring green vehicles and reducing overall fleet size. Green vehicles include alternative fuel vehicles that run on fuel other than gasoline or diesel, zero-emission vehicles such as electric and fuel cell vehicles, hybrid vehicles, and PZEVs (partial zero-emission vehicles) that have zero evaporative emissions and clean tailpipe emissions. Low-speed electric vehicles (LSVs) are also an important component of the strategy.

Campus Recycling and Refuse fleet now powered by biodiesel For the last 3 years, Campus Recycling and Recycling Services (CRRS) has been using biodiesel fuel in one of its large recycling collection trucks on a pilot basis, but recently converted all three collection vehicles to biodiesel. Because the blend of biodiesel (50% biodiesel, 50% petrodiesel) was not fully tested when CRRS first started using biodiesel, they initially only converted one truck. The net result of using biodiesel derived from waste vegetable oil combined with extra exhaust filters is cleaner air from our collection activities. Photo credit: Lisa Bauer



Zimride Comes to UC Berkeley Parking and Transportation launched a Zimride rideshare system in February. The Zimride platform connects Cal community members to rideshares through an easy to use private network that will reduce campus traffic, parking difficulties, and help to reduce the carbon footprint of the campus community. Through Zimride's web-based interface, faculty, staff, and students will be able to find others with similar commuting patterns or for one-time rides. As a social network platform with optional Facebook integration, Zimride is fun to use and helps establish trust among users.

Interesting Fact *Just four years after adoption of the Campus Bicycle Plan, the campus has increased the number of bicycle commuters by 850, a 20% increase to 5,100 daily riders.*

Food & Housing

Current Conditions Cal Dining continues to **increase the percentage of its purchases of sustainable food**, which has gone up almost three percentage points in the past year (to 26.8%, exceeding the campus goal). The campus Sustainable Foodservices Working Group has developed a workplan and a set of strategies to work with campus foodservice operators and the campus at large to increase the sustainability of food purchases and operations. Residential and Student Services Program (RSSP), which coordinates multiple sustainability programs in residence halls, has a new [website](#) that highlights the sustainable work being done by that department.

Food & Housing At A Glance

- ✓ [Cal Dining](#) has four 100% certified organic salad bars; offers pre- and post-consumer composting in its kitchens and dining halls; sells its waste oil to be converted to biodiesel; has trayless dining at all locations; offers compostable containers, kitchenware, and cups; offers a discount for reusable coffee cups; uses 100% organic milk in dining halls and 100% organic eggs in all facilities; ensures 75% of entrees are vegetarian; partners with Buy Fresh, Buy Local and Community Alliance with Family Farmers; and donates food to a non-profit family shelter.
- ✓ Cal Dining's food is 99.9% free of trans fat and hydrogenated oils.
- ✓ The [UC Berkeley Sustainable Foodservices Working Group](#) is implementing a workplan to achieve the sustainable food purchase goal for campus vendors.
- ✓ The [ASUC Sustainability Team](#) runs The Local, a organic vegetable and fruit stand.
- ✓ The [Residential Sustainability Program](#) (RSP) – a student-run program in the campus residence halls, is a dedicated group of coordinators and volunteers who aim to promote sustainable living through peer education – has initiated and supported a variety of programs to increase awareness and promote sustainable living, including Sustainability Week and Earth Week activities.
- ✓ The [Global Environment Theme House](#) brings together students and faculty to explore issues around environmental change, natural resources, sustainable environments, and environmental leadership. The Theme House also includes the [Green Suite, Green Apartment, and Green Room](#) demonstration areas.
- ✓ The Residential Student Services Program offers annual [move-out and move-in](#) programs, including Reader and clothing drives.

Figure 9: Sustainable Food Purchasing at UC Berkeley, 1990-2009

	1990	1995	2000	2007	2008	2009
Total sustainable purchases (%)				18.9%	24%	26.8%

Data from Cal Dining only; purchases from additional campus foodservice vendors will be included in future years. **Includes purchases that are local, organic, fair trade, or humane.**

Food & Dining Goal

By 2020, increase sustainable food purchases by campus foodservice providers to at least 20% (UCOP pending)

Key Strategies:

1. By December 2009, complete a report that sets sustainable foodservice practices goals, addresses plans to achieve these goals, and shows the feasibility of including self-operated or contract operations; provide a yearly progress report on these goals starting July 2010. (UCOP pending)
2. Provide student patrons access to educational materials that will help support their food choices. (UCOP pending)
3. Engage in activities with the surrounding community that support common goals regarding sustainability. (UCOP pending)
4. Encourage the use of third-party “green business” certifications for sustainable dining operations. (UCOP pending)
5. Expand membership of UC Berkeley’s Sustainable Food Subcommittee and establish regular meetings to set goals and review progress.

Plans The UC Berkeley Sustainable Foodservices working group will report on sustainable food purchases for the first time to the UC Office of the President. Data has been requested from all campus food vendors. Cal Dining will investigate the use of reusable to-go containers in their dining halls. Students in RSSP, working with the Residence Hall Assembly, plan to investigate ways to expand the new Green Residents program.

2009-2010 Features

Students learn how to survive in the concrete jungle The new RSP Urban Camper Campaign encourages students living in the residence halls to live consciously as they navigate through the concrete jungle, without using so many disposables. RSP distributed an “Urban Camper Kit” including a reusable bag, bottle, hand towel, utensil, and food container. Future kits may add re-used notebooks made from cereal boxes and scratch paper.

UCB Dining Halls Go Trayless Starting spring semester of 2010, Crossroads, Foothill, Clark Kerr, and Café 3 dining halls eliminated nearly all of the plastic trays. The initiative was started by students to cut food waste, water and energy use, and overconsumption. In October 2009, “Trayless Fridays” held at Crossroads and Clark Kerr showed a decrease in food waste by 16 percent. Some trays will still be available in one central location in each hall for those who need them, like clients who use trays for mobility assistance.

Two other programs also work to reduce food waste Clean Plate, Clean Planet encourages responsible eating habits, by tabling in the dining halls and offering prizes for students who clean their plates. All of the prizes distributed were items that could be used to reduce environmental impact, including reusable bottles, bags, hand towels, utensils, and containers. In the Eat the World, Save the Earth program, Student Sustainability Coordinators help educate students throughout the year about food waste. They also educate students in the residence halls about recycling and water and energy conservation.

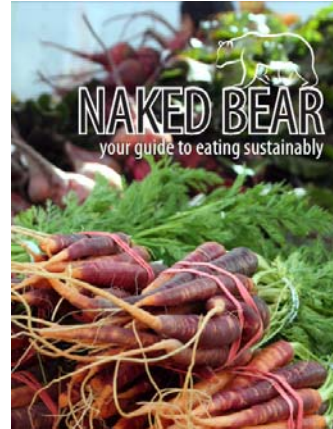


Food & Housing

ReUSE and RSSP work to reduce waste during move in/out [ReUSE](#) holds a Reader & Clothing Drive in the Residential Halls in May each year to collect used course readers and unwanted clothing during move-out week. The readers are given away for free to the campus community at the beginning of each semester – in January 2009 over 700 used readers were distributed to students. ReUSE also conducts a “Second Chance Clothing Sale” each Fall to sell collected clothing (usually 40 – 50 extra large sized bags) from the move-out collection drive. The clothing is all priced at \$3 or less, and proceeds from this sale go directly to help run the ReUSE program on campus.

Naked Bear Magazine—Food Sustainability Journalism DeCal

The Naked Bear is a student-produced, student-published magazine aiming to educate and inform the campus community about food sustainability issues and practices. Jenna Kingkade used a \$10,000 grant from BRITA’s “Filter for Good Eco-Challenge” to print 10,000 copies of the magazine, half of which they distributed over two days in April 2010. The other half will be distributed to incoming freshmen. An exciting part of the production process was in the design of the DeCal class for the contributors to the Naked Bear. The class focused on several aspects of journalism and began with an introduction to elementary journalism, covering skills such as how to pick sources, how to conduct interviews, and how to make future stories.



Eat, Learn, Live: Hundreds Read and Discuss Omnivore’s Dilemma When the new Letters and Science students arrived on campus in the fall of 2009, they arrived having something to talk about – each had received a complimentary copy of Michael Pollen’s book *Omnivore’s Dilemma* and were invited to choose from a rich array of discussion sessions and seminars designed to foster dialogue and debate about the book. Now in its fourth year, the [On the Same Page](#) Program sponsored a series of public events, such as a film screening and a food fair called “Eat, Learn, Live, the Ultimate Interactive Food Experience with Michael Pollen” (co-sponsored by Cal Dining).

Quotable *“We get three votes a day, actually more, when we eat. If we cast some of those votes with full consciousness of what’s involved, and try to make better choices — which might entail spending more money or going out of our way — then that will help create the food chain we want.”⁵*
Professor Michael Pollan

⁵ [UC Berkeley News](#), “Journalism professor Michael Pollan’s new book on the U.S. food chain provides few soundbites — but much to chew on,” April 11, 2006

Land Use

Current Conditions In April 2010, the [B.E.A.R.S. Initiative](#) – a campaign to revitalize Lower Sproul, emphasize sustainability, and promote student interests – was passed. Major new campus development is under construction in the blocks west of campus, adjacent to Berkeley’s downtown and to regional transit hubs. In 2010 the Helios Energy Research Facility was approved for a site three blocks north of the downtown Berkeley BART station and without associated parking; a building previously on the site has been demolished, and concrete crushed for reuse in the new construction.

UC Berkeley continues to implement the relevant portions of the [2020 Long Range Development Plan](#), including those in the Sustainable Campus section. Efforts also continue on the implementation of the [Strawberry Creek Management Plan](#).

Land Use At A Glance

- ✓ The [2020 Long Range Development Plan](#) (LRDP) describes a framework for land use and investment to meet the academic goals and objectives of the University. The companion [Environmental Impact Report](#) provides information on the environmental implications of the LRDP and includes an extended treatment of potential impacts and mitigation best practices. Importantly, the LRDP delineates a comprehensive approach for achieving a sustainable campus and has been amended to require that the campus design all aspects of new projects to achieve our short- and long-term greenhouse gas emissions reduction goals.
- ✓ The campus has increased permeability on at least seven construction projects since the implementation of the 2020 LRDP.
- ✓ Implementation of the 1987 [Strawberry Creek Management Plan](#) has significantly improved water quality.
- ✓ The [Strawberry Creek Restoration Program](#) began in 1987, aims to eliminate harmful discharges to the Creek and provides hands-on training in restoration for university and K-12 students. The program also works to restore three designated Natural Areas on Campus (the Grinnell, the Goodspeed, and the Wickson) through weed removal and native plant re-vegetation. The Strawberry Creek Restoration Program thrives today due to the donated labor and funds of Cal students, staff, and faculty as well as alumni and campus neighbors.
- ✓ There is a native plant nursery and garden to support the restoration of Strawberry Creek.
- ✓ At the Richmond Field Station, the campus has finished restoration of five acres of salt marsh habitat and maintenance of upland coastal prairie with the assistance of over seventy student interns completing independent studies in ecological restoration.
- ✓ The campus has a written Integrated Pest Management plan, which aims to reduce the use of pesticides on all campus grounds.

Land Use Goal

Plan every new project to serve as a model of resource conservation and environmental stewardship (LRDP)

Key Strategies:

1. Implement an ongoing program of investment to restore and renew the campus park landscape; implement a program of strategic investment in new and enhanced campus open park spaces. (LRDP)
2. Continue to manage runoff into storm drain systems such that the aggregate effect of projects implementing the 2020 LRDP is no net increase in runoff over existing conditions. (LRDP EIR)
3. Continue to revise and implement the Strawberry Creek Management Plan (SCMP) to include recommendations for habitat restoration and enhancement along specific segments of the creek. (LRDP EIR)
4. Continue to implement an urban runoff management program as published in the Strawberry Creek Management Plan. (LRDP EIR)
5. Manage the natural preserves based on ecological principles, including replacing invasive exotic plants with native plants suited to this biotic zone, replacing unhealthy plants and plants at the ends of their natural lives, and preserving and enhancing the habitat value of the zone. (LRDP)
6. Manage the hill campus landscape to reduce fire and flood risk and restore native vegetation and hydrology patterns. (LRDP)
7. Preserve the character and livability of the city around UC Berkeley, and enhance the economic and cultural synergy of city and university. (LRDP)
8. Provide housing, access, and services to promote full engagement in campus life; increase undergraduate bed spaces to equal 100% of entering freshmen plus 50% of sophomores and entering transfer students by 2020. (LRDP)

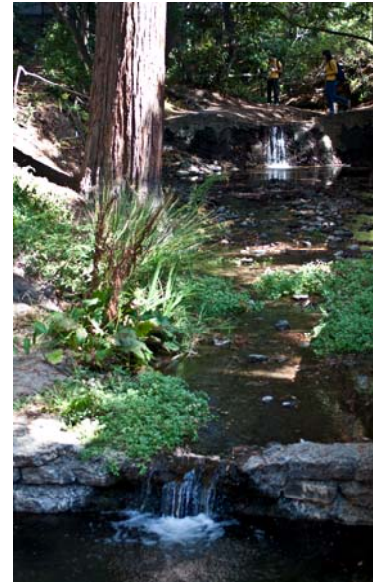
Plans UC Berkeley has provided leadership participation and fiscal and staff support to the City of Berkeley's efforts to revise its Downtown Area Plan, which will receive voter consideration on the local ballot in November 2010. The DAP effort will influence how the City responds to [SB 375](#), which supports infill development as a means of reducing greenhouse gas emissions from vehicle miles traveled and links transportation funding to land use decisions.

[Environment, Health & Safety](#) staff will conduct field investigations for the remainder of the Richmond Field Station to address legacy industrial contamination that occurred before University ownership. One of the TGIF-funded projects will work to reduce chemical use at the UC Botanical Gardens by establishing a compost tea brewing and application program as part of a pest management program.

Land Use

2009-2010 Features

Students help restore Strawberry Creek The Strawberry Creek Student Restoration Leadership program helps recruit, train, and coordinate the activities of Student Habitat Restoration Leaders (SHRLs). These SHRLs form a corps of Cal students who will be available to promote and lead volunteer habitat restoration events on University-owned open space within the Strawberry Creek, Claremont Creek, and Codornices Creek watersheds. The campus Student Restoration Leadership program will expand in 2010-11 to the Richmond Field Station to continue restoration maintenance with help from a TGIF grant.



The campus removes non-native trees in the hill campus area In the East Bay, pre-settlement conditions consisted of a significantly larger coverage of grasslands and chaparral, which have been largely supplanted by housing and exotic tree species. UC's eucalyptus and pine dominated forests are at risk of catastrophic wildfire and associated carbon releases. As of 2008, over 150 acres of the 800 acre Hill Campus have begun the conversion process toward native forests (oak, redwood, bay trees), and the campus is working with FEMA to fund additional hazardous tree removal.

Projects work to convert lawns to water-saving vegetation The [CACS](#)-funded Strawberry Fields Forever project has selected the lawn at the northwest corner of Kroeber Hall to be converted to an educational native garden. This converted lawn will yield significant reductions in water use and maintenance costs, eliminate the need for fertilizers by composting in place, while showcasing regionally appropriate plants. A second grant will expand the size of the garden and provide educational signage.

A [TGIF](#)-funded project – Lawns to Meadows – will result in a master plan to convert selected grass lawns to regionally appropriate plants to promote more efficient use of water and resources, while respecting how open space is used and the character-defining features of the landscape. Two contrasting sites will be selected as model sites, and at least one workshop will be conducted to develop guidelines for future work.

Interesting Fact *In November 2009, the UC Regents approved a project to construct more than 420 beds of undergraduate housing on an existing surface parking lot three blocks south of campus.*

Academics & Learning by Doing

Current Conditions UC Berkeley continues to offer a sizeable number of undergraduate and graduate degree programs and courses related to the environment and/or sustainability, having recently received funding to add a sustainability master's program. The campus also supports a large number of related research and research centers. Our core mission – teaching, research, and public service – provides an opportunity to use the campus as a research and learning laboratory for sustainability.

UC Berkeley students often build on this academic framework and create and participate in extracurricular and service learning activities on campus. There are at least 25 student-run environmental organizations, including the ASUC Sustainability Team and the Building Sustainability @ Cal program. These groups regularly contribute to a [Sustainability Forum](#) to stay informed about how various campus entities are working towards sustainability and to provide networking opportunities. In the past year, through the clubs and internships offered on campus, students have conducted water conservation research, started a food cooperative, published a food magazine, celebrated Earth Week, and designed an on-line reuse exchange. Grant programs, like TGIF and CACS, offer opportunities for students to develop and implement campus programs and build partnerships with staff.

Academics & Learning by Doing At A Glance

- ✓ The campus offers over 450 environment and sustainability courses; at least 10% of departments offer at least one of these courses. A full listing is available on the [BIE Enviro Portal](#).
- ✓ The campus offers over 30 [undergraduate programs](#) related to the environment or sustainability and over 50 [graduate degree programs](#). Full listings are available on the BIE Enviro Portal.
- ✓ The Berkeley Institute of the Environment also maintains a current list of environment- and sustainability-related [research](#).
- ✓ [UNEX](#) has an extensive range of sustainability-related courses and programs, including sustainable design, energy for sustainability, and environmental monitoring.
- ✓ There are at least 25 student groups active on environment- and sustainability-related issues.

Plans In the coming year, the Office of Sustainability will add depth to its communication campaign through a teaching, learning, and change module that includes in-depth staff training, job shadowing opportunities, and student multi-media communications production for the web. The Sustainability Forums will continue and expand to reach more students. A new student group, the Berkeley Green Alliance for Innovative Action, will work with the ASUC Office of the President to increase collaboration between the numerous energy and environmental clubs by hosting regular meetings, a monthly lecture series, and possibly an annual conference.

2009-2010 Features

College of Natural Resources to offer new sustainability master's program The campus was recently awarded funds to develop a [new master's program in sustainable development](#) practices. As part of a global network, the cross-disciplinary professional program will admit its first students in fall 2011 and will combine the work of faculty from fields including engineering, business, public health, and public policy.

Academics & Learning by Doing

Campus offers a range of interesting sustainability courses UC Berkeley offers [a sizeable number of courses related to the environment and sustainability](#). For example, HIST 120AC covers American environmental and cultural history, while a scientist and a humanities professor provide an introduction to environmental studies in ENGLISH C77. The Haas School of Business offers a course on energy and environmental markets (MBA 212) and one to help students learn how to take technologies from the laboratory to the marketplace (MBA 290T.5, ENG 290).

UC Berkeley Extension expands its sustainability options The UC Berkeley Extension (UNEX) has expanded its offerings related to sustainability in three ways. First, it launched a new Sustainable Studies initiative, which builds on its successful sustainable design program, and expands the range of relevant courses with an interdisciplinary approach. It also added two new specialized programs of study: the Professional Program in Solar Energy and Green Building and the Professional Program in Leadership in Sustainability and Environmental Management. Third, UNEX announced its new designation as a U.S. Green Building Council (USGBC) Education Provider. UC Berkeley Extension is the first continuing education program at the University of California, and one of the few public continuing education programs in the country, to offer USGBC-approved course credits.

A new student group provides hands-on help The Greening Operations (GO!) Team was formed in 2009 by Building Sustainability @ Cal as a student resource group to provide waste, water, and lighting audit services, as well as educational and outreach services. The idea of GO! Team is for a group of trained students to be prepared to provide these services on a case-by-case basis throughout the semester. The students are split into two branches: special events composting and outreach/education. The special event branch focuses on helping event organizers keep their events sustainable by helping event attendees properly dispose of their waste. The educational/outreach branch focuses on working in specific buildings to provide sustainability presentations tailored to building inhabitants.

Socially Responsible Investment Fund provides hands-on experience In 2007, the Center for Responsible Business at the Haas School of Business launched the [Haas Socially Responsible Investment Fund](#), the first and only student-run fund of its scale (\$1M+) within a leading business school that is focused on both social and financial returns. The Fund's aim is to contribute to the field of social investing by defining and exploring new ideas around unlocking hidden value based on companies' environmental, social, and governance (ESG) practices.

New center for sustainable chemistry The new [Berkeley Center for Green Chemistry](#) will advance green chemistry through research, teaching, and engagement in three interdisciplinary areas of inquiry: new chemistries, health and environment, and policy and economy. Through the 21st Century Chemical Science Instruction program, the College of Chemistry will redesign its undergraduate curriculum (including a new undergraduate minor in sustainability and a designated emphasis in sustainability for graduate students). The college will also work to transform its laboratories to use less energy and reduce chemical waste.

Interesting Fact *A new unit of energy savings may be named after Professor Emeritus Art Rosenfeld – the “Rosenfeld” would be defined as electricity savings of 3 billion kilowatt-hours.*

Awards and Honors

UC Berkeley continues to be a leader in campus sustainability and has been recognized by many organizations. The campus has received awards as a member of the UC System (not listed) as well as individual awards.

UC Berkeley Awards and Honors

- “Top 10 Cleantech Universities in the U.S. for 2010.” Cleantech Forum.
- Five-Star Rating (2), “Relevant Coursework Available” and “Relevant Courses on For-Profit Impact,” *The Sustainable MBA: A Guide to Business Schools Making A Difference*, 2010-2011. Aspen Institute.
- “Campus Sustainability Leader,” *The College Sustainability Report Card*, 2010 (Grade B), 2009 (Grade B), 2008 (Grade B+). Sustainable Endowments Institute.
- “Cool School,” 8th place, 2009. *Sierra Magazine*.
- “Exemplary Programs in On-Campus Clean Energy Sources & Cogeneration, Plans to Do More with Recycling, Solid Waste, & Materials, and Plans to Do More with Green Landscaping & Grounds,” *Campus Environment 2008: A National Report Card on Sustainability in Higher Education*. National Wildlife Federation.
- Environmental Achievement Award, 2008. Region 9, U.S. Environmental Protection Agency.
- Green Rating – 99, Green Rating Honor Roll, 2010, 2011. Princeton Review.
- Green Rating – 95, 2009. Princeton Review.
- Campus Sustainability Leadership Award – Honorable Mention, 2007. American Association for Sustainability in Higher Education.
- “Fifty schools that will help your kids help the planet,” 2007. *Kiwi Magazine*.
- “Greenest Colleges and Universities – Runner Up,” 2007. *Grist*.
- “Best Overall,” 4th Annual Flex Your Power Award, 2006. Flex Your Power.
- Best Practice Award (Monitoring-Based Commissioning for LeConte Hall), 2010. University of California.
- Best Practice Award (Monitoring-Based Commissioning for Tang Health Center), 2009. University of California.
- Best Practice Awards (2 – HVAC Design and Lighting Design/Retrofit), 2008. University of California.
- Best Practice Awards (Materials Reuse for LeConte Renovation; Honorable Mention, Best Sustainable Design for University Village Housing), 2007. University of California.
- Best Practice Award (Integrated Design Process), 2006. University of California.
- Student Energy Efficiency Award, 2008. University of California.
- Student Sustainability Program Award, 2008, 2007, 2006. University of California.
- Certificate of Merit for Outstanding Achievement (water pollution prevention efforts), 2004. California Water Environment Association.
- Industrial Pollution Prevention Award, 2002. East Bay Municipal Utility District.
- Integrated Pest Management Innovator Award, 1996. California Environmental Protection Agency, Department of Pesticide Regulation.

Campus Grants

2009-2010 TGIF Grantees

Bike to Work Day Regional Sponsorship: Fund regional sponsorship in 2010

Cal Habitat Restoration Student Leadership Training: Program to train students to promote and lead volunteer habitat restoration events

Custodial Staff Outreach: Conduct an outreach/education campaign between custodial staff and building occupants

"End the Cycle" - Sustainable Laundry Campaign: Implement a sustainable laundry education campaign in the residence halls

Greening Kroeber Art Studios and Bathrooms: Develop a design/marketing campaign to create awareness in Kroeber Hall about sustainability

Hydration Station Installation and Design Guidelines for Existing Buildings: Develop design guidelines and install two hydration stations in Dwinelle and MLK Union

I Heart Tapwater Campaign: Hire two interns

Mobilizing Sustainability at Berkeley - The Greening Operations (GO!) Team: Fund a group of students to provide building audits and green event outreach on a case-by-case basis

Reduction in Chemical Use at the UC Botanical Gardens: Establish a compost tea brewing and application program as part of a pest management program

Retrofitting the RSF into a Human Powered Gym: Retrofit a stationary bike and ellipticals at the RSF to derive power from human use

Teaching, Learning, and Change (TLC): Create year-long career training and mentoring effort for students and staff

UC Berkeley Energy Symposium: Sponsor the 2011 UC Berkeley Energy Symposium

Water Metering and Conservation: Install water meters in eight more buildings and increase water publicity/education

Wurster Hall Sub-Metering: Install energy sub-meters in five floors of Wurster Hall

2010 Green Fund Grant Recipients

Green-Lighting McCone Hall: Lighting retrofit to improve technology and motivate occupants

Harnessing People Power: Development of a prototype exercise machine to generate usable electricity

Counting Bikes on Campus: Purchase two pedestrian and bike counters to improve data on bicycle and pedestrian routing and safety

Rags to Riches: Purchase of canvas bins to expand program that collects and resells used clothing from residence halls

Lights, Camera, Action: Partial funding of a portable videoconference system to reduce business travel emissions

Strawberry Fields Forever: Expanding an existing water-saving/native plant project to include educational signage and a larger garden

Statement of Commitment

UNIVERSITY OF CALIFORNIA, BERKELEY Statement of our Commitment to the Environment

University of California, Berkeley students, faculty, and staff are committed to taking a leadership role as responsible stewards of the physical environment and to using educational and research activities to promote environmental awareness, global thinking, and local action. This commitment includes:

- Protecting and enhancing the campus environment;
- Purchasing environmentally preferable products, minimizing the use of toxic substances, and handling wastes responsibly;
- Conserving natural resources through their sustainable use in building projects, transportation, and campus operations;
- Significantly reducing campus greenhouse gas emissions;
- Conducting innovative research on sustainable technology and practices;
- Increasing awareness of these values through instruction and example; and
- Collaborating with a diverse and engaged campus community on these issues to help fulfill the University's mission.

We are making this commitment because:

- UC Berkeley is a world leader in education and research, and must also be a leader in environmental stewardship;
- Realizing these values will create a healthier educational and work environment;
- Resource conservation helps save valuable resources for future generations and lowers operating expenses; and
- Our commitment serves as the foundation of a system to assess, prioritize, and implement campus environmental programs and sustainability initiatives.

By embracing these values and integrating them into all University activities, we can better fulfill the University's mission of teaching, research, and public service.

November 29, 2007