



The California State University
OFFICE OF THE CHANCELLOR

The CSU Commitment to Sustainability

2011 Report

System and Campus
Achievements in
Developing Sustainable
Practices and
Career Pathways

The California State University
Office of the Chancellor

Capital Planning Design and Construction
and the Office of Public Affairs

April 2011

www.calstate.edu/cpdc/sustainability

Our Commitment to Sustainability

The California State University is the largest system of senior higher education in the country, with 23 campuses, 936 buildings and a \$130 million annual utility budget. A faculty and staff of 43,000 educate and serve more than 412,000 students – [reflecting the diverse communities of the state](#). The mission of the CSU is to provide high-quality, affordable education to meet the ever-changing needs of the people of California.

Since 1978, CSU policies have affirmed the need for the university to be a wise steward of energy resources. For 30 years, the CSU commitment to sustainability has grown in reach and scope—and in 2008 the CSU Board of Trustees adopted a strategic plan titled Access to Excellence. The plan identifies sustainability as a major public need to be systematically integrated into teaching, service, research and facilities management.

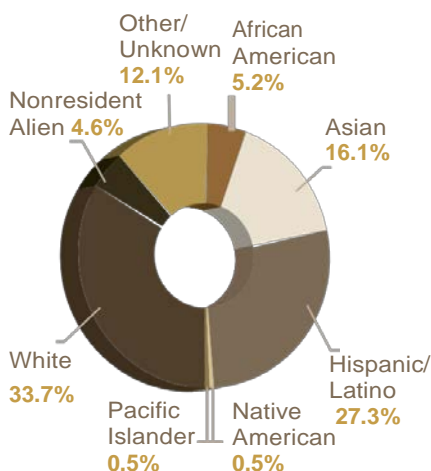
The CSU has worked to reduce the system's environmental impact and carbon footprint through on-campus green power generation and by controlling the energy consumption of university buildings. To achieve the intent of AB 32, California's landmark legislation to reduce global warming, the CSU will soon have over 11 MW of solar generation with another 11 MW anticipated in 2012, and recognizes effective transportation demand management as another key tool to reduce greenhouse gas emissions.

Many new and emerging academic programs are responsive to students' interest in pursuing green jobs. Environmentally conscious student development, with the integration of sustainability into the curriculum, will improve California as over 95,000 CSU graduates join the state's skilled workforce each year.

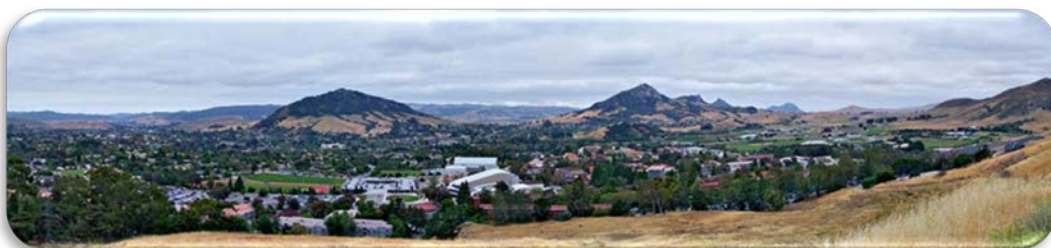
The university's best institutional practices and hallmark strengths—teaching, applied research, and community service—all play a special role in sustaining the continued economic and ecological viability of the state.



*California State University
Chancellor's Office*



*CSU System Fall 2010
Enrollment by Ethnicity*



Cal Poly San Luis Obispo, recognized in 2008 as the Leading School for Environmental or Sustainability Goal-Setting by the National Wildlife Federation

Building Design and Operations

The CSU has achieved numerous project certifications through the Leadership in Energy and Environmental Design (LEED) rating system—the U.S. Green Building Council's certification program for high performance, sustainable buildings. The CSU has 36 completed and existing buildings that are LEED certified, of which six are gold rated and three are silver rated. Two more existing buildings are pending certification. CSU building design is structured to achieve energy efficient buildings through use of commissioning and comprehensive mechanical peer review. While not all projects participate in the LEED rating system, these key elements combined with increased staff, design and construction team environmental awareness help create sustainable LEED equivalent buildings systemwide.

The CSU has 10 buildings in design or construction that are also expected to qualify for LEED certification, including the new Aztec Center Student Union at San Diego State. The student-funded center is on track to become the CSU's first LEED Platinum certified building, which was a key student objective for the facility. Sustainable features include a vegetated roof, solar panels, day lighting, radiant floor system, ground heat exchanger, sunshades, underground storm water tank, and the re-use of demolished building materials. as.sdsu.edu/new_aztec_center/

At Cal Poly San Luis Obispo, the recently completed Poly Canyon Village provides student housing for 2,700 residents and earned a LEED Gold certification. The design includes low volatile organic compounds material, energy efficient buildings, reduced water use, water-efficient landscaping, use of recycled content, 90 percent diversion from the landfill of construction waste, and more. polycanyonvillage.calpoly.edu/

The CSU Chico Student Services Center is a four-story, 120,000-square-foot facility housing 26 departments with over 300 staff and student employees. This convenient, multi-service facility was designed for water efficiency, storm water reuse, high efficiency window glazing, and innovative use of natural daylight. The sustainable features earned the building LEED Gold certification. [csuchico.edu/fcp/SSC LEED/](http://csuchico.edu/fcp/SSC_LEED/)

CSU design standards, as a method of implementing the Chancellor's Executive Order 987, require all new construction and major renovation projects to exceed the 2008 California Energy Code (Title 24, the most stringent in the nation) by at least 15 percent and 7.5 percent respectively.

From top to bottom:

*San Diego State's
Aztec Center*

*Cal Poly San Luis Obispo's
Poly Canyon Village*

*CSU Chico's
Student Services Center*



Smarter, More Responsive Energy

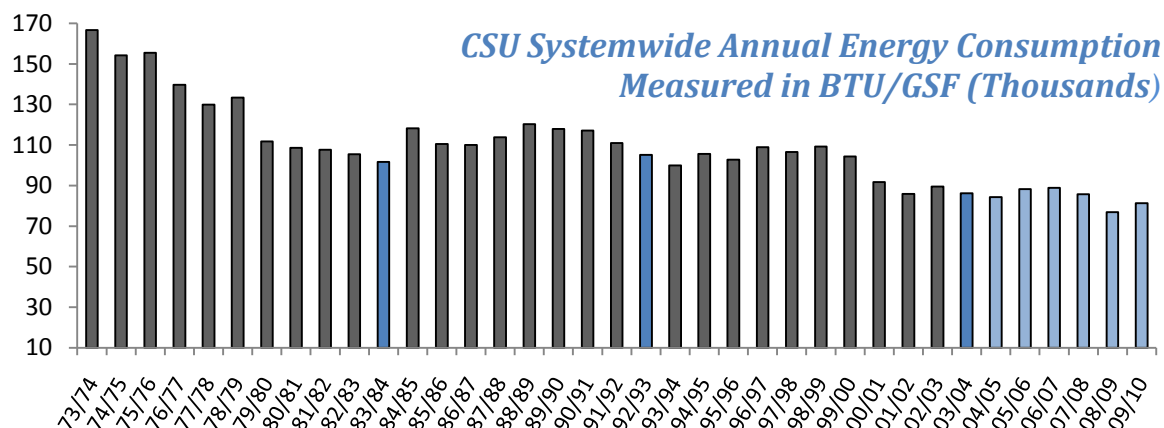
The CSU, UC and investor-owned utilities created a statewide Energy Efficiency Partnership to reduce persistent and peak energy demand. The partnership provides a permanent framework for a sustainable, long-term, comprehensive energy management program at the CSU and UC campuses served by PG&E, SDG&E, SCE and So Cal Gas. Established in 2004, the program has assisted the CSU in saving over \$8 million in operating costs per year and obtaining \$13 million in incentives.



The CSU has 26 existing buildings employing a process called Monitoring Based Commissioning (MBCx) to optimize building operations. As an example of efficiency gains through MBCx, the CSU San Bernardino Chemical Sciences building achieved an eight percent reduction in electricity use, a 35 percent reduction in chilled water load, and a 70 percent reduction in hot water use, for an annual cost savings of \$50,000. calstate.edu/PA/News/2009/green-projects.shtml

Of the 23 CSU campuses, 19 participate in a demand reduction program incentivizing campuses to curtail facility/building systems energy use during periods of peak electrical demand when the electrical grid is heavily loaded. The CSU system is able to collectively provide up to 8MW of demand reduction when it is most needed. Energy storage strategies, such as chilling or freezing water at night to cool campuses during the day, also help reduce CSU peak demand.

Based on a national standard developed by the EPA, the CSU has reduced building energy use by 50% over the last 35 years. In 2003/04 the CSU set an ambitious goal of reducing energy intensity by an additional 15% by 2008/09. Due to increased demand resulting from new academic and support technologies, as well as the unavailability of funding for some efficiency projects, the CSU achieved half of this goal, as of 2010.



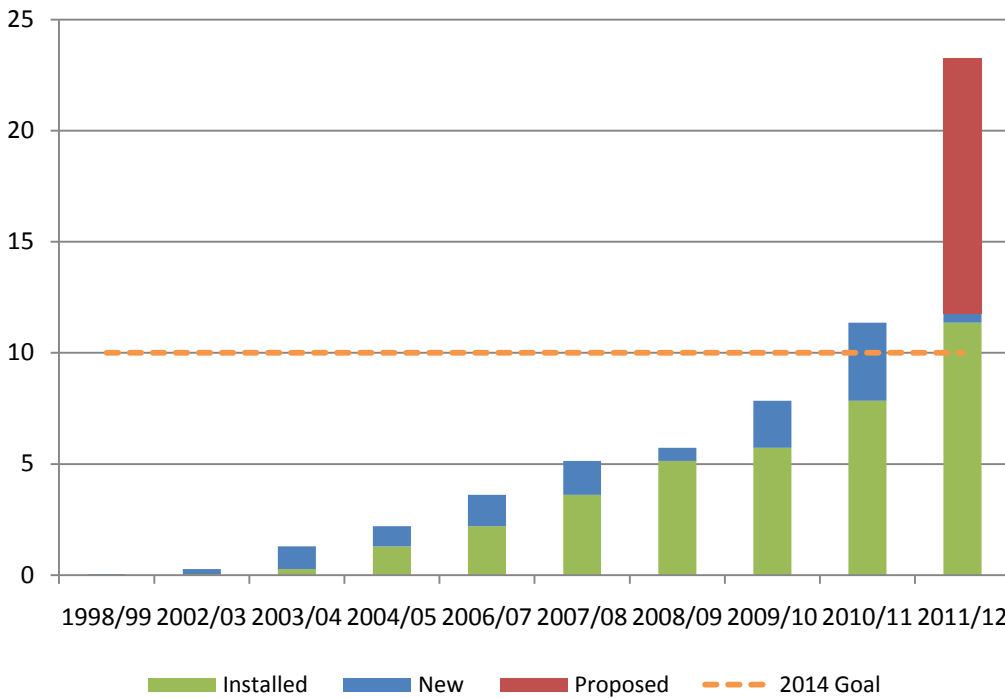
CSU San Bernardino staff monitor building energy consumption on the hunt for inefficiencies

Green Energy Generation

The CSU is committed to developing reliable distributed generation that increases efficiency and reduces its carbon footprint. The CSU Board of Trustees set a goal of 10 megawatts (MW) of solar power generation by 2014. The CSU plans to exceed this goal by the end of 2012 with 11.5 MW of solar. blogs.calstate.edu/cpdc_sustainability/?p=635

The CSU has also teamed with the State’s Department of General Services to install solar power. The recently announced phase III agreement is proposed to add another 11 MW by 2012.

CSU Systemwide Solar Power Generation Measured in Megawatts



Solar panels covering a CSU Bakersfield parking lot are lit from below at dusk



CSU East Bay solar panels on the roofs of the campus Music Building, Gymnasium, Meiklejohn Hall, and the Arts and Education Building

CSU campuses are also increasing use of other low-emission and renewable sources. In partnership with Pacific Gas & Electric and Southern California Edison, CSU campuses will be the site of fuel cell demonstration projects providing learning opportunities for students while reducing campus operating costs and carbon footprint through waste heat recovery.

Through a combination of solar, cogeneration, wind and fuel cell sources, the CSU is on target to reach and exceed a trustee goal of 50 MW of onsite generation (a comprehensive chart is shown on page 14).

Research Centers and Institutes

The CSU has nearly 30 centers and institutes on 13 campuses dedicated to environmental and energy issues. An additional 18 centers and institutes are dedicated to agriculture or water—with seven coastal marine stations and laboratories. The system supports and coordinates the CSU Council on Ocean Affairs, Science and Technology, the CSU Agricultural Research Initiative and the CSU Water Resources Policy Initiative.

calstate.edu/research/

Sonoma State houses the Environmental Technology Center—a model for sustainable building techniques and technologies. This center includes extensive sets of tools for energy management and control, and serves as a training facility for students, professionals, local government, businesses and the community.

sonoma.edu/ensp/centers_preserves/

On California's North Coast, the Schatz Energy Research Center at Humboldt State works to establish clean energy technologies specializing in renewable energy, energy efficiency and hydrogen energy systems.

schatzlab.org/

In Southern California, the John T. Lyle Center for Regenerative Studies at Cal Poly Pomona is a 16-acre demonstration community showcasing regenerative strategies and technologies, such as low-energy architecture, water treatment, organic agriculture, ecological restoration and sustainable community development.

csupomona.edu/~crs/

At the Moss Landing Marine Laboratories, students have access to one of the nation's best programs in Marine Science. Students have access to the program through seven CSU consortium campuses: East Bay, Fresno, Monterey Bay, Sacramento, San Francisco, San José and Stanislaus. A LEED Gold certified building serves both Moss Landing students and faculty.

mlml.calstate.edu/

The Desert Studies Center is a field station of the CSU located among a haven of natural ponds, dry lakes, and foothills in the Mojave Desert east of Barstow. The center is located within the Mojave National Preserve, providing the opportunity for individuals and groups to conduct research, receive instruction, and experience the desert environment.

biology.fullerton.edu/dsc/



The Environmental Technology Center at Sonoma State is a model for sustainable building techniques and technologies



Large solar panels activated at the Cal Poly Pomona Lyle Center on Sept. 30, 2010, making the 16-acre site carbon neutral

Degree Programs

CSU campuses offer more than 150 environmentally related degrees and certificates. From the dense forests surrounding Humboldt State to the mountainous and desert environments in proximity to Cal Poly Pomona and CSU San Bernardino, the diversity in California climates, wildlife, land use and energy sources provides a rich learning environment for CSU academic programs.

calstate.edu/app/programs/ECS/

The master's in Geosciences at San Francisco State provides students with knowledge of geology, meteorology and oceanography. These fields are critical to understanding many environmental problems including air and water contamination, coastal erosion and climate change.

tornado.sfsu.edu/

The master's in Environmental Science at CSU Dominguez Hills prepares professionals in government, planning, education, research, journalism, law and academia to address and solve environmental challenges. Due to the location of the campus, the program emphasizes environmental problems and opportunities in an urban setting.

csudh.edu/catalog/2009-2011/EnvironmentalScience.htm

The innovative bachelor's in Environmental Science, Technology and Policy at CSU Monterey Bay links natural science, physical science, technology, economics and policy. The program emphasizes the critical thinking and technical skills necessary to develop workable solutions to complex environmental problems.

sep.csumb.edu/estp/

These programs are possible due to incredible CSU faculty. This includes Assistant Professor Sean Anderson of CSU Channel Islands who has worked for years on wetland restoration and research on Louisiana's Gulf Coast.

blogs.calstate.edu/voicesviews/?p=631

Indicative of the expertise of our faculty, CSU Chico students have the opportunity to learn from Nobel Laureate Jeff Price. Price is an Assistant Professor in the Department of Geological and Environmental Sciences and one of the lead authors of the Intergovernmental Panel on Climate Change report that received the Nobel Peace Prize in 2007.

csuchico.edu/nsci/researchlinks/price.shtml

From top to bottom:

The CSU Desert Studies Center

Humboldt State students in a North state forest

The CSU Moss Landing Marine Laboratories



Student-Led Initiatives

The Green Campus Program is a student-led initiative that promotes energy efficiency outreach through educational campaigns. Green Campus Interns work with CSU staff on their campus to research and implement energy efficiency best practices and facilitation of retrofits. These efforts include lighting equipment and usage surveys, laboratory energy assessments and student housing energy conservation competitions. The program is cooperatively funded by the Alliance to Save Energy and California utility companies.

ase.org/about-green-campus



Eight campuses currently host Green Campus Interns:

[Chico](#)

[Pomona](#)

[Fullerton](#)

[San Luis Obispo](#)

[Humboldt](#)

[San Bernardino](#)

[Long Beach](#)

[San Diego](#)

Student Fee Funding

The students of three universities have instituted energy efficiency and sustainability programs paid for from student fees.

Each Chico State student pays \$10 per semester to fund energy projects, the annual This Way to Sustainability Conference, and the salaries of the sustainability coordinator and interns.

suchico.edu/sustainablefuture/studentActivities/

Humboldt State students pay \$10 per semester to the HSU Energy Independence Fund for energy efficiency projects on campus. The savings are paid back to the fund and reinvested in later energy projects.

humboldt.edu/heif/

The new San Diego State Student Union building will be built LEED Platinum using funds from a student approved fee initiative. Student activity fees also pay for upgrades to existing buildings and Greenfest—a weeklong festival celebrating sustainable awareness and Aztec pride.

sustainable.sdsu.edu/

Career Pathways

Universities serve as effective platforms for generating and sharing a vast amount of knowledge related to sustainability and applied environmental technologies. This is particularly important given the growth of green jobs over the past 15 years. From 1995 to 2008, core green economy employment in California grew 36 percent. This is almost triple California's total employment growth over the same period. CSU program offerings align the CSU's educational and leadership goals with numerous undergraduate majors and graduate degree programs related to sustainability and environmental studies.

Among these degree programs, the CSU has developed Professional Science Master's (PSM) programs focused on the environment. As part of earning a degree in a PSM program, students intern in an industry or public sector position. The PSM is designed to generate a clear pathway from studying science, technology, engineering and math to a career in applied sciences. Examples of PSM programs in the environmental sciences are located on the CSU campuses of [Chico](#), [Humboldt](#) and [San Bernardino](#).

The Green Campus program also helps students build pathways to green careers through trainings, mentorships, internships, volunteer opportunities and project-based learning. Many former interns have gone on to careers in campus facilities services, engineering consulting firms, government and sustainability planning companies.

ase.org/about-green-campus

Working to build the number of green jobs, San José State is a founding partner of the Environmental Business Cluster that assists start-up companies that make environmental products or provide environmental services. The cluster has graduated over 75 companies, and 80 percent of the clients are clean and renewable energy companies. The technologies adopted by these companies solve serious environmental problems and reduce reliance on non-renewable energy sources. The cluster also provides technology commercialization assistance to federal and state grant-funded research scientists.

environmentalcluster.org/

PSMTM
PROFESSIONAL
SCIENCE MASTER'S



Sustainability through Service

Students of the CSU annually dedicate more than 32 million hours to community service. Increasingly, students spend their time on projects that promote sustainable practices.

CSU Dominguez Hills Biology Department faculty and students are actively engaged in service-learning projects with their students at the Gardena Willows Wetland Preserve, with the goal of controlling fennel, a highly invasive noxious weed. nbs.csudh.edu/cuer/

CSU East Bay Global Environmental Problems course students also removed invasive plant species, planted native plants, pulled weeds, and collected litter from local waterways and estuaries. csueastbay.edu/csci/departments/earth/

The Humboldt State University Service Learning Center student interns and staff have been busy this year mobilizing "Go-Green-Sustainability" efforts in Humboldt County, aimed at supporting community partnerships focused on food security and sustainability, community development and outreach. humboldt.edu/servicelearning/

The Cal Maritime Garden Club has recruited around 25 cadets to assist in a campus sustainability project that recognized the need to cultivate unused land at Cal Maritime, and plant trees and fruit as a means of giving back to the campus community.

CSU Northridge MBA students carried out an [assessment](#) of the feasibility of introducing a bicycle-sharing program on campus. A student group has now formed a bicycle co-operative and is hoping to bring a bicycle maintenance and rental facility to the campus.

Cal Poly San Luis Obispo has implemented a freshmen immersion project aimed at creating more socially equitable and environmentally sustainable goods and services. sustainslo.org/site/Welcome.html

San Francisco State teamed with others in the bay area to increase high school students' understanding of and skills related to key STEM concepts related to environmental science through hands-on learning in a joint Community Air Quality Youth Participatory Action Research program.



Humboldt State student clearing brush

Campus Highlights

Supported by awards totaling nearly \$1 million, the Smart Grid Center at Sacramento State engages in product testing of automated metering infrastructure and develops practical field solutions for large-scale integration of Smart Grid technologies. ecs.csus.edu/CASmartGrid/

The Cal Poly Pomona Campus Shuttle Mobile Phone Program provides students with the opportunity to see the five Bronco Express routes, view bus status in real time and received estimated arrival time for their route via text message and video displays at most stops. These displays are solar powered and audio enables for low-vision students.

dsa.csupomona.edu/parking/campusshuttles.asp

As a campus with staff dedicated to transportation demand management, CSU Monterey Bay integrates their Otter Trolley, bicycle traffic management and even a very active student ride share program into their campus master plan. news.csumb.edu/new-mst-service-campus

Through their sustainability program, CSU East Bay and its food service provider, ARAMARK, work to promote environmental stewardship programs and policies related to food service, conservation and waste stream management.

campusdish.com/en-US/CSW/CSUEastBay/Sustainability/

Student, faculty and staff at CSU Chico are able to compost leftover food, napkins, plates and coffee cups at the Bell Memorial Union Marketplace. This practice reduces waste management costs and landfill impact.

news.csuchico.edu/2010/09/24/as-recycling-increases-composting-options-on-campus/

The California Maritime Academy's Simulation Center is a \$7.2 million facility that provides students ship navigation training in a variety of situations without the environmental impact of operating an actual vessel.

csum.edu/web/industry/simulation-center

In response to growing global fuel supply and price concerns, Cal State L.A. is developing a hydrogen fuel station through its Power, Energy and Transportation curriculum. Strategically located in proximity to major freeways in the LA area, the facility will be within range of other hydrogen stations funded by the South Coast Air Quality Management District.

calstatela.edu/faculty/vseaman/Hydrogen_Station.php



The Cal Maritime Simulation Center replicates real-world condition without the carbon emissions

Award-Winners

In 2009, the CSU system, Humboldt State University and CSU Northridge each won an award through the annual Chill Out: Campus Solutions to Global Warming competition, sponsored by the National Wildlife Federation (NWF).

calstate.edu/pa/news/2009/chill_out.shtml

CSU Northridge received the NWF Chill Out award in recognition of its 1 MW fuel cell power plant—the largest such installation at any university in the world. The ultra-clean plant produces 18 percent of the campus's electricity. Partnered with cogeneration, the fuel cell produces 22 billion BTU of useful thermal energy annually. The system has a combined efficiency double that of power on the nation's electricity grid and produces nearly zero particulate emissions. The campus also created a dense planting area known as the "rainforest" to absorb waste carbon.

www-admn.csun.edu/ppm/fuel-cell.html

The state's Flex Your Power campaign recognized the CSU for reducing power use during critical demand periods throughout the summer. CSU campuses shut down or reduced the use of electricity hungry systems when called to do so by the California Independent System Operator.

calstate.edu/pa/news/2008/flex_your_power.shtml

Now in its ninth year, the 2010 California Higher Education Sustainability Conference gathered students, faculty, staff and administrators from the state's three public higher education systems to learn from each other about the best sustainable practices. During the conference, nine projects spanning seven CSU campuses (Humboldt, Northridge, Pomona, Sacramento, San Bernardino, San José, and San Luis Obispo) received 2010 best practice awards.

calstate.edu/pa/News/2010/story/Best_in_Green.shtml

Each award represents the hard work and dedication of university students and employees. Floyd Dudley II, the assistant director of Energy and Engineering Services at CSU San Marcos, is an example of this dedication to sustainability. For his role in reducing the university's energy consumption, Dudley was recognized as the 2010 Young Energy Professional of the Year by the Association of Energy Engineers.

blogs.calstate.edu/voicesviews/?p=779



The "rainforest" at CSU Northridge is fed by waste water and carbon from the 1 MW ultra-clean fuel cell power plant



Next Steps

CSU's commitment to sustainability is built on the foundation of efficient operation, design and construction of our 23 campuses in order to provide a high quality, affordable educational environment. That commitment will continue growing with increased on-campus clean energy generation, more pervasive smart building controls, and greater student involvement and curriculum development to prepare the next generation of "green" professionals.

The CSU will continue its partnership with utility companies to leverage incentive funding for energy efficiency projects, demand reduction programs and renewable on-site generation. Additionally, campuses have to develop strategic energy plans coupled with sustainability actions plans that will become the roadmaps for reaching our sustainability, energy efficiency and climate change goals. The plans will include sustainable procurement, water conservation, transportation demand management and climate action plans.

The CSU continues to focus on energy conservation. The CSU will continue to use voter approved bonds to improve the efficiency of existing building systems while renewing the state's capital investment. In addition, we look forward to improvements in the instructional technology area with virtual computing and reduction of servers on campus. Since 2003-04, the energy use per full time equivalent student dropped by almost six percent. Continued support of the energy efficiency program, utility partnerships, and increased assessment of facilities performance will continue to move CSU toward its energy reduction goal.

For the system to meet its efficiency goal, campuses learn best practices from each other. To aid in that learning, CSU Long Beach is hosting the 10th Annual Higher Education Sustainability Conference in 2011. This annual event, attended by higher education institutions across the state, focuses on sustainable design, construction, and operation of campus facilities as well as sustainability practices in student housing, curriculum development and nursing/hospital programs.

CSU Onsite Generation Summary

Through a combination of cogeneration, wind and fuel cell sources, the CSU is on target to reach and exceed a trustee goal of 50 MW of onsite generation by 2014. Each MW of onsite generation is equivalent to powering approximately 1,000 homes. This means that by reaching the trustees' target, the CSU will generate enough power for 50,000 homes while reducing the university's reliance on greenhouse gas producing, "dirty" forms of energy.

Onsite Generation by Campus Measured in Megawatts

<i>Campus</i>	<i>Photovoltaic</i>	<i>Cogeneration</i>	<i>Other Sources</i>
Bakersfield	1.0		
Channel Islands		1.5	
Chico	0.3		
Dominguez Hills	0.6		
East Bay	1.0		
Fresno	1.2		
Fullerton		4.5	
Humboldt		1.9	
Long Beach	0.4	0.2	
Monterey Bay	0.9		
Northridge	0.7	0.2	1.2 fuel cell
Pomona	1.1		
San Bernardino	1.3		.01 wind
San Diego	0.3	14.4	
San Francisco		1.5	
San José		6.0	
San Luis Obispo	0.7		
Sonoma	0.2		
<i>Planned installations</i>	<i>11.5</i>		
Total	22.1	30.2	1.21

CSU Sustainability Facts at a Glance

- 36 facilities LEED certified, 10 more in design/construction expecting LEED certification
- Solar PV installations totaling 10.5 MW (equivalent of powering 11,000 homes), plus more in design or construction
- 30 MW (29,000 homes) of on-site energy cogeneration
- 18 MW of thermal energy storage capacity
- Since 2003, the CSU invested over \$50 million in energy efficiency, reduced operational costs by \$8 million annually and leveraged over \$13 million of utility incentive funding
- Reduction of more than 25,000 metric tons of CO₂ equivalent emissions since 2004, this is the equivalent of taking 4,500 cars off the road
- 35-year track record of energy and greenhouse gas reduction
- Six CSU campuses signed the Presidents' Climate Commitment: Pomona, Bakersfield, Chico, Fullerton, Monterey Bay and San Francisco
- Innovative and emerging technologies in facility design and renovation
 - Cal Poly San Luis Obispo – The new Center for Science and Mathematics will employ chilled beam systems for space temperature control in laboratories and conference rooms.
 - CSU San Marcos and San Francisco State – Campuses retrofitted numerous meeting/conference rooms and classrooms with an Integrated Classroom Lighting System that uses high optical efficiency fixtures, integrated occupancy and daylight control sensors, and plug and play low voltage wiring for easy installation
 - CSU Fullerton – Campus exterior lighting design standards were updated to include the latest LED parking lot and garage lighting and integrated occupancy based dimming controls.

CSU Websites for More Information

Access to Excellence: calstate.edu/AccessstoExcellence/

Commitment to Sustainability: calstate.edu/cpdc/sustainability

Green Sheet: calstate.edu/pa/greensheet

Impact Study: calstate.edu/impact/sustainability.html



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