

UCSB Campus Sustainability Plan Template

Draft 5/23/2006

Change Agent Group Goals- Waste

Background Data for Recycling:

The practice of reducing, reusing, and recycling has been in effect at UCSB for more than decade. Many of our recycling efforts have been in place since long before the passage of the State legislature bill AB75 (which took effect on January 1, 2000). AB75 required us to reduce our landfill weights by 25% by the year 2002, and 50% by 2004. To develop and implement a comprehensive "campus plan to end waste disposal," will require a multi-tiered effort of improving the chain of **reducing the amount of waste generated, reusing material whenever possible, recycling remaining material, identifying partnerships for use of waste products** – helping to creating the next "cradle" industries, and **procurement efforts** that require take-back programs, bio-based products, and improved packaging that creates less waste. Zero Waste is a design principle for the 21st Century that seeks to redesign the way resources and materials flow through society. Zero Waste requires eliminating subsidies for raw material extraction and waste disposal, and holding producers responsible for their products and packaging "from cradle to cradle." The goal is to promote clean production, prevent pollution, and create communities in which all products are designed to be cycled safely back into the economy or the environment with consideration and mitigation of the impact of transporting materials.

In addition to the target areas above, the campus has begun to address its **green house gas (GHG) emissions** this past year. Working together, the Bren School's Campus Climate Neutral Master's Group Project, the California Climate Action Registry, Physical Facilities, and Housing & Residential Services (H&RS) have identified and inventoried the campus' emissions. Though we completed the assessment for year one, additional work is required to collect all the necessary data for both stationary and mobile sources. The Bren School has a second Group Project that will continue this partnership and help us address corrective measures required to reach the net zero GHG emissions goal by 2020.

List of Current Sustainable Practices:

Recycling/Waste Disposal	1998	1999	2000	2001	2002	2003	2004	2005
-Total waste production in tons ¹	5657.59	5536.19	6956.32	5587.95	5430.32			
-Recycled solid waste	2326.55	2236.84	3594.96	2433.43	2550.01			
-Total percent of recycled material	41.12%	40.40%	51.68%	43.55%	46.96%			

¹ MarBorg weights plus Recycled weights for campus

There are currently a number of recycling programs within the UCSB campus:

- 1) **Recycling Program-** The program currently consists of a partnership between building occupants, Physical Facilities Recycling Program, and Associated Students Recycling. Jointly, these efforts combine to provide a large component of the recycling for the campus. There is also an on-going effort to ensure that every office and laboratory have both trash and office-pack containers (as locations are approved by the campus Fire Marshall). At ground level, there are seventy-three AS recycling clusters (bertha's), forty-four recycling dumpsters for office pack, fourteen recycling dumpsters for glass/newsprint/aluminum/ plastic, thirty-eight recycling dumpsters for cardboard, one super pack dumpster for recycling books and magazines, and one 40-yard roll-off for recycling metals and a collection site for shipping pallet drop-off, pick-up, and reuse.

In our annual waste-stream audits, we check to ensure we are capturing as much as possible for recycling. The data provided shows that office pack is the largest contributor to UCSB's waste stream, at **37%** by weight. Other papers include cardboard, magazines, and books, which comprise **10%** of the sample study. Plastic volumes follow at **9%**, organics at **6%**, glass at **2%**, and aluminum cans at 1%. Trash comprised **35%** in a recent study.

At key locations in pilot buildings (Bren Hall, Ellison Hall) additional containers capture glass, plastic & aluminum, magazines, and newspaper. The departments in these spaces have added to the formal efforts and employ student assistants/volunteers to help consolidate recyclables and get them to the next point in the recycle chain within UCSB.

(Mary Ann Hopkins is to pass us updated numbers)

In 2003, UCSB kept 188.1 tons of "office pack" from the landfill. However, the waste stream audits on this campus are showing that "office pack" is still the main ingredient **-58%-** of our landfill trash. This is a lower number than we have had before but still not acceptable. "Office pack" can be recycled many times back to its high quality content.

Current successful practices in this area include:

1. Annual waste audits and on-going measurement and verification
2. Campus green awards

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3. Outreach to local grade schools and colleges
4. Bicycle pick-up and transportation of recycled goods from clusters
5. Small e-waste collection bins (5 locations on currently on campus) that are moved in cycles to acquire small e-waste from building occupants
6. Wood pallet collection/reuse/recycling program

Insert campus-recycling map here

2) **Housing & Residential Services**

Housing & Residential Services recycles all dormitory and office solid waste as co-mingled materials (plastic, glass, aluminum, office pack) as well as electronics, used clothing, batteries, scrap metal, large appliances (refrigerators, stoves/ovens), and motor oil. The dining commons recycles or composts used cooking grease, vegetable prep material from the dining commons, and coffee grounds. In some years over 100,000 pounds of kitchen wastes have been diverted from the landfill. At year's end and during renovations furniture mattresses, construction and demolition material, asphalt, concrete, packaging material, fluorescent light bulbs, ballasts, and all hazardous waste are sorted and recycled appropriately.

For the past ten years, H&RS has conducted a "Waste Awareness Week" campaign during move-in week in the halls and dining commons. The goal of this program is to educate students in the H&RS recycling program and help answer questions on what can be recycled in the halls as well as how to reduce food waste in the dining commons. This program has included "Recycling Olympics" contests and well as "Art from Scrap" contests. Major outreach efforts are also made during Move-Out month – educating students on what they can recycle at collection centers that are set up they can easily drop-off material to be reused (clothing, food, kitchenware, shoes, books, small appliances, and furniture).

Current successful practices in this area include:

1. Extensive recycling program (that links back to the AS/PF program)
2. Education and outreach programs for "move-in" and "move-out"
3. Recycling contests

3) **Construction Waste Management Plan-** With the construction of Donald Bren Hall, the UCSB campus crafted and initiated its first construction waste management plan that integrated site protection, noise abatement, and recycling. This plan required the contractor to sort all recyclables, retain soil on site and protect trees, cover construction material and provide storm water filtration to keep particulates from exiting the site. On the Bren Hall project, the contractor was able to reuse 100% of the demolition waste, and approximately 93% of the waste generated during construction. This plan has been improved and is now a basic requirement for all construction at UCSB.

4) **Green Waste-** Green waste is collected by Physical Facilities and Housing & Residential Services, then stored at two central locations and routinely picked-up to be mulched by an independent contractor. This mulch is then used by either local farmers or returned to the University campus for use in the landscape. Certain tree trimmings are chipped and the wood chips are used as mulch for weed control and water conservation, or recycled off-campus to create valuable compost. The Cheadle Center for Biodiversity and Ecological Restoration, which manages natural areas on campus, uses green waste for compost that is mixed with horse manure from the Campus Stables, sand and some bulk soil for potting mix for native plants.

UCSB uses various methods for handling grass cuttings. In some instances, the clippings are collected on an every-other cutting basis. In other locations, mulching blades provide a fine-enough product that the clippings can remain on the lawn as a future aid in returning nutrients to the soil. This results in reduced use of fertilizers such as nitrogen, as grass clippings are nitrogen rich and the compost builds and strengthens the soils.

All green waste is considered a viable commodity by the University, and our commitment is to ensure that whatever is taken from the land is eventually returned to the land via the most practical and environmentally friendly methods possible.

Current successful practices include:

1. Grass-cycling
2. Local chipping and mulching
3. Provide green waste/mulch for the local community

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Improved Approach to Grounds Management-The impact of pesticides and fertilizers in our site and surrounding ecosystems is an issue the campus has been addressing as the campus is surrounded by the ocean and wetlands. Use of harmful pesticides in our operations can make their way into the waste stream and eventually be transported off-site. Current practices have the campus moving away from non-environmentally friendly products. They have phased-out the use of most harmful pesticides and now use mainly bio-rational herbicides. The campus has dramatically reduced the use of systemic herbicides such as RoundUp and is constantly experimenting with alternative means of weed control that take a more natural approach. Unlike Roundup and other herbicides that affect plant growth regulation, all of these bio-rational herbicides have a physiologic mode of action that causes cellular disruption rather than a biologic mode of action against which weeds can build up genetic resistance.

Current practices include:

1. Reduction/elimination in non-environmentally friendly products
2. Use of environmental friendly products including:
 - 1) Organa-all purpose fertilizer derived from agave
 - 2) 90% sulfur prill to balance soil pH
 - 3) Worm castings are used everywhere on campus
 - 4) Corn gluten used to inhibit weeds (around Bren Hall)
 - 5) In very limited application the waipuna system is used, which is an organic hot foam weed control system.

Lawns use Turf Supreme 25 Nitrogen/5 Phosphorus/5 Potassium- the only lawns that receive fertilizers are the playing fields. Playing fields only get fertilized three times per year and the phosphorus run-off levels are monitored. The campus is also incorporating more artificial turfs for the high use areas, which reduces both fertilizer use and water consumption. Eventually campus will go to all artificial turfs for all playing fields.

Natural Areas on Campus (Campus Lagoon, Manzanita, North Bluff, Storke Wetlands) are planted with locally collected seeds and plants grown from those seeds. Plants are grown on campus using organic inputs and 95% of weed control is implemented by hand before weeds drop their seeds. Diverse native plantings that are adapted to the site microclimate provide resources to support natural biodiversity in vertebrate and invertebrate fauna and require no inputs of water or fertilizer and very little maintenance after an initial intense weeding effort. These lands are managed with the help of student interns and volunteers and the sites are used as educational tools for class field trips and research projects.

- 5) **Food Waste**-The campus has had short-lived pilot projects in both composting and vermiculture, but these practices have not been very effective in dealing with the quantity of food waste generated on site. H&RS has been composting pre consumer vegetable waste for 12 years. Residential Dining commons have successfully modified their food delivery systems in the newly renovated dining commons, which has reduced the amount of food waste generated. H&RS has also been integrating locally grown produce and organics into their offerings – creating a cleaner quality of waste to deal with. In addition the retail-based University Center is composting coffee grounds and kitchen scraps, and is recycling their co-mingled solid waste stream.

Current successful practices in this area include:

1. Reduction in food waste by updating food production and service systems in H&RS dining commons and through menu revisions based on historical meal count data
2. Integrating locally grown organics into the food offerings
3. Recycling cooking oil (starting 5/8/06 – all grease/oil waste from H&RS, Faculty Club and UCen Dining will be picked up by Biodiesel Co. – who process and distributes biodiesel fuel back to UCSB Transportation Services for use in fleet vehicles)
4. Composting pre consumer vegetable matter
5. Pulper at one dining commons and compactors at 3 dining commons reduces volume
6. Donation of food product to local food banks when students leave campus for vacations.
7. Education of students through waste awareness campaigns and fairs
8. UCen Dining Services recycles all coffee grounds and produce waste in Marborg "green bins"

- 6) **Water Management** – The campus has been implementing the initial phases of sustainable water management for a number of years. Since the drought in the early 1980's and with the increasing complexity of water issues, UCSB has been factoring water efficiency into project planning at an early stage. The university specifies plumbing fixtures that reduce water usage. The campus has installed waterless urinals, and dual flush toilets, as well as low flow faucets, flush valves, and showerheads. Thus far, the waterless urinal has not only achieved great success in functionality and water savings, but also in maintenance cost. The campus uses reclaimed water

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for the majority of its irrigation and, at this time, reclaimed water reaches approximately 90% of campus. The campus also uses reclaimed water successfully in some toilets in the first floor of Bren Hall. UCSB has also developed bioswales to help purify storm water before it goes back to the ocean or back into the existing water table.

Current successful practices in this area are:

1. Reclaimed water irrigation delivery to 90% of the campus
2. Specification of low-flow plumbing fixtures and waterless urinals for all new projects
3. Dining commons use of pulper saves approximately 8 gallons of water per minute
4. The Manzanita, Lot 30, and Lot 38 bioswale projects
5. The chilled water loops
6. Weekly parking lot and street cleaning to decrease impact through storm water run-off
7. Labeling of storm drains to avoid unwanted liquid waste from draining to the ocean
8. Closed-loop cleaning systems used in portions of H&RS kitchen dish machines

- 7) Hazardous Materials Program-** Environmental Health & Safety's Hazardous Materials Program assures compliance with all Federal, State, and local hazardous waste regulations through education, campus cooperation and by implementing practical and efficient policies while providing a cost-effective hazardous waste management program to protect the environment. Lab personnel are formally educated on waste disposal practices through the EH&S lab safety orientation, or online training equivalents. Informal follow-up training is often done during waste pick-up visits. The program utilizes web-based forms for laboratories, shops, and offices to request pick-up of hazardous materials. Materials must be segregated, labeled and packaged according to the Campus Hazardous Waste Disposal Procedures. Once a request is received, the EH&S staff pick-up the material from the campus, transport it to their specialized facility, and prepare the material for recycling or disposal. Disposal facilities and technologies are selected using the disposal hierarchy: reuse, recycling, treatment, incineration or placement in landfill to protect the University's long-term environmental liabilities.

Materials EH&S administers include:

1. Chemicals
2. Bio hazards
3. Universal Waste (batteries, lamps, e-waste)
4. Radioactive materials

Current successful practices in this area include:

1. Free waste pick-up/transportation of materials from research laboratories
2. Specialized facility to handle/sort hazardous materials
3. On-going measurement and verification
4. Campus training and education
5. Adopt-a-Chemical Program

- 8) Community / Household Hazardous Waste Program-** In a cooperative agreement with the County of Santa Barbara, Environmental Health and Safety manages the operations of their Community Household Hazardous Wastes Program. The EH&S facility is used by the county as a drop-off/collection point for community members and Conditionally Exempt Small Quantity Generators or small businesses. Household Hazardous Wastes (HHWs) are materials commonly used in and around residential households that contain toxic substances. These include household cleaning products (drain cleaners, oven cleaners, floor and furniture polish); painting products (paints, stains, finishing products and thinners); automotive products (motor oil, old gasoline, anti-freeze, car batteries, transmission, brake and steering fluids, solvents); garden products (fertilizers, pesticides, herbicides); hobby supplies (solvents, photochemicals); and pool supplies (Chlorine).

- 9) Central Stores-** This division of the campus provides a service by providing storage space and surplus disposal for furniture, electronics, and excess equipment. Departments can re-purchase used furniture many times, extending its useful life. Once pieces reach the end of their campus life, Stores then holds open shopping for the public where community members can purchase items at a greatly reduced rate. E-waste is the largest component of the surplus program. Though much of this is sold to the public at reduced prices, large lots are sold to brokers, and the balance recycled to certified Recyclers.

Current successful practices in this area include:

1. Furniture and equipment reuse program
2. Electronic waste program
3. Public resale program

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4. Pick-up/transportation to the next step in recycling chain
5. Toner cartridge recycling program
6. Phone book pick-up/recycling program

For the past few years, Central Stores has been implementing environmentally friendly procurement practices. They have integrated a number of green products into their offerings.

10) Air Pollution Reduction- An informal partnership between the Bren School's Campus Climate Neutral Master's Group Project, the California Climate Action Registry, Physical Facilities, and Housing & Residential Services has allowed the campus to make strides forward in planning for green house gas (GHG) reduction in fiscal year 05/06. This work included an inventory and assessment of GHG, which was further verified by a third-party certifier, and accepted by the California Climate Action Registry. The campus is now "certified" for its year one data, and future years include additional targets for a more complete set of data collection for both mobile and stationary sources. The Energy Manager at UCSB along with sustainability change agents have also encouraged the UC system to include a higher percent of clean energy in the systemwide energy contract. Currently, this contract requires 20% of its power from clean sources.

H&RS purchased its first alternative fueled vehicle (an all electric Ford Escort Wagon) back in 1993. Since that time they have invested in more than 25 alternative fueled vehicles including both electric and natural gas units. They have also purchased more than ten bicycles for their staff to use instead of cars. To further reduce air emissions H&RS has installed renewable energy systems at residences halls and apartments (hot water systems), pools, and a 5kw photovoltaic electric system. They have also purchase and installed high efficiency equipment (boilers, chillers, HVAC equip, computers, printers, monitors, appliances, and other energy using equipment).

For the past few years, the campus has begun to include hybrids in its fleet as well as electric vehicles that can be used on site. The campus also has a very active Transportation Alternatives Program (TAP). TAP was developed to provide alternative commuting options for UCSB faculty, staff, and students, striving to conserve energy, reduce campus parking demand, traffic congestion, air pollution, and global warming.

Current Successful practices in this area include:

2. Participation in California Climate Action Registry (CARROT) inventory
3. Energy metering
4. TAP program
5. Hybrids and electric vehicles in the fleet
6. 20% Green energy in the energy contract

11) Microchemistry in Classroom and Research Labs - All teaching laboratories use micro-chemical methods to reduce chemical usage. Professors and three laboratory supervisors are trained in micro-chemical techniques and implement them effectively. This includes general, organic, bio-, physical and analytical chemistry laboratories. Waste streams have been small for many years, and have been reduced additionally by using smaller chromatography columns, for example. Toxic and hazardous wastes are managed by EH&S.

Mission Statement:

Reduce the UCSB waste stream to zero using the parameters of the Natural Step system.

Long Term Vision: The vision of this team is to create a campus that has net zero waste impact and to make enough money from of our waste to fund project cost and research that will aid in further gains. **Zero Waste** expresses the need for a closed-loop industrial/societal system - waste is a sign of inefficiency. Our use of the term Zero Waste includes "Zero Solid Waste", "Zero Hazardous Waste", "Zero Toxics" and "Zero Emissions". Zero Waste promotes not only reuse and recycling, but also, and more importantly, promotes prevention - designs that consider the entire product life cycle. These new designs will strive for reduced materials use, use of recycled materials, use of more benign materials, longer product lives, repairability, and ease of disassembly at end of life.

The term "**net zero waste**," (what remains after all deductions have been made) implies that there will still be some quantity of waste we still need to address in 25 years. We expect that there will be some mitigation measures that will have to be taken to off set the differential.

Goals /Action Items (measurable or numerical data)

Short term (0-1 years)

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1. Characterize the waste on the UCSB campus
 - a. Review what data we are currently able to collect from PF Recycling, Grounds, Central Stores, H&RS, Student Health Services, and EH&S, Dining Commons Staff, and UCen dining services staff
 - b. Assess gaps in data collection systems and modify tracking systems to accurately account for these items
 - c. Consolidate data and characterize it to see where we can make the biggest impact in reductions in year one
 - d. Study/analyze the next step in the chain –where our recycling goes
 - e. As part of plan, identify reduction targets of 5-10% in waste (taking campus growth into account)
 - f. Target other “simple” improvements that can be made based on #5 above
 - g. Craft short- and long-term plan along with cost-benefit analysis for implementation
 - h. Present plan to CPC subcommittee on sustainability for implementation
2. Work with Procurement team on printed material (catalogs received) reduction of 50%
 - a. Meet with the Procurement Team and Mail Services and identify ways in which we can most efficiently work together to contact vendors to stop printed catalogs from coming to the campus
 - b. Identify and implement measurement matrix for assessing success of program
 - c. Where appropriate, contact vendors to have them pull staff, faculty, students from their mail database
 - d. Work with Procurement Team and Mail Services to look at data (measure success of program)
3. Determine current regulatory framework
 - a. Identify two Waste Team members to research UC, local, state, and federal requirements
 - b. Have the two members report back to the Waste Team on findings
 - c. Assess regulatory items and include their impacts in #1 e above
4. Prior to completing #1e above, evaluate the waste stream with regard to the parameters of the Natural Step system (four system conditions: 1) not to systematically increase concentrations of substances extracted from Earth’s crust, 2) not to systematically increase concentrations of substances produced by society, 3) not to systematically increase degradation by physical means, and 4) ensure that people are not subject to conditions that systematically undermine their capacity to meet their needs)
5. Work with Grounds Team to assist them with improving practices on green waste
 - a. Meet with Grounds, H&RS, CCBER staff to assess current practices and brainstorm ideas for improvements
 - b. Include recommendations in #1e above
6. Work with AS and all campus departments on campus education
 - a. Meet with AS recycling staff to craft an education and outreach plan for the campus
 - b. See if they can sponsor an internship to create the “Recycling and Resource Guide for students and staff at UCSB”
7. At the end of year one, re-measure and evaluate the waste-stream data
 - a. Make list of items in year one that are yet to be completed
 - b. Re-assess and update intermediate and long term goals based on year one findings

Intermediate (1-5 years)

1. Assess items yet to be completed in 0-1 year goals, create project time-line to complete the list
2. Update the UCSB Waste Management Plan
 - a. Reassess operational practices to see if there are other things we need to do improve practices (close the gap on waste)
 - b. Implement an improved/consolidated waste tracking system for the campus (measurement & verification)
 - c. Based on successes in year one, identify strategy to improve recycling (AS/PF/H&RS) by 10% within 2 years, 25% within five years
 - d. Work with Food Team on full implementation program to reduce food waste by 25% (reuse issues will also be addressed here)
 - e. Work with Food Team on implementing composting - in conjunction with the campus and waste disposal company to find site and vessel for composting all disposable products, pulp and post consumer waste
 - f. Write and implement specification for all dining commons kitchen renovations projects to include water-conserving appliances such as pulpers
 - g. Work with Grounds, H&RS, and CCBER to convert to on-campus mulching to reduce transport
 - h. Work with Grounds Team on developing protocols for fossil free landscaping
3. Water/Waste Water:

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- a. Work with Physical Facilities, H&RS, EH&S and Water Team to craft short- and long-term plan for improving the quality of storm water/waste water/sea water systems
4. GHG:
 - a. Study and implement campus emissions and craft short- and long-term plan for implementing reductions air pollution (set target reductions)
5. Hire consultant to study waste heat recovery and implement recommendations
6. Laboratory Protocols-Working with EH&S and LABRATS:
 - a. Assist in identifying, developing, and implementing training protocols for microchemistry for the campus
 - b. Develop more sensitive detectors or alternate techniques to reduce or eliminate ethidium bromide and other toxic chemicals in teaching labs
 - c. Develop and implement techniques to conserve water in teaching labs
 - d. Develop research laboratory protocol and assessments to reduce solid and liquid wastes
7. Working with the Procurement Team implement changes in systemwide agreements:
 - i. Craft plan and strategy to implement packing reductions and equipment/furniture/ and chemical take backs programs
 - j. Craft plan to increasing post-consumer product offerings
 - k. Complete a "close the loop-study" and assess ways to partner with individuals, companies, NGO's to create next step in the process for re-use of our waste – create incentives for research in this area

Long Term (5-10 and 10-20+)

- 1) Extend chilled water loops to all campus buildings (to decrease quantity of wastewater)
- 2) Continue work on emissions reductions
 - a. Implement clean fuel strategies for generators
 - b. Work with Transportation Services for clean/alt fuel fleet implementation
 - c. Waste heat recovery implementation
- 3) Implement findings from #2 above in new construction protocols
- 4) Continue work in microchemistry implementation
- 5) Continue work on storm water quality plan (all water leaving campus site should be pollutant free)
- 6) Continue work with Food Team on full implementation program to reduce food waste by 50% (5-10 yrs) and 80% (10-20 yrs), 100% (20-25 yrs)
- 7) Implement findings from #10 above and help create new industries (profitable way of dealing with our waste)
- 8) (5-10 yrs) 50% reduction in total weight (per capita) of campus waste
- 9) (5-10 yrs) Identify and remove or replace the worst (most environmentally problematic) waste leaving campus
- 10) Study ways to eliminate balance of waste from the campus – create implementation plan
- 11) (10-15 yrs) 80% reduction in total weight (per capita) of campus waste
- 12) (20-25 yrs) 95% reduction of total weight of campus waste
- 13) (25-30 years) 100% reduction of total weight of campus weight

Barriers:

1. Insufficient data/ data security protocol
2. Lack of community / business support
3. Lack of funding to implement changes
4. Education and communication challenges
5. Lack of infrastructure
6. Lack of buy-in across campus (both within departments and the central administration)

Action Items:

1. Gather all currently available campus waste records.
2. What about waste heat? Is this being captured somewhere else?
3. What about waste CO2? Is this being captured somewhere else?
4. Determine current regulating bodies and current regulation along with future regulated goals
5. Brainstorm ways to determine possible un- or lightly documented waste streams.
6. Determine method to be used to evaluate waste streams based on the Natural Step method.