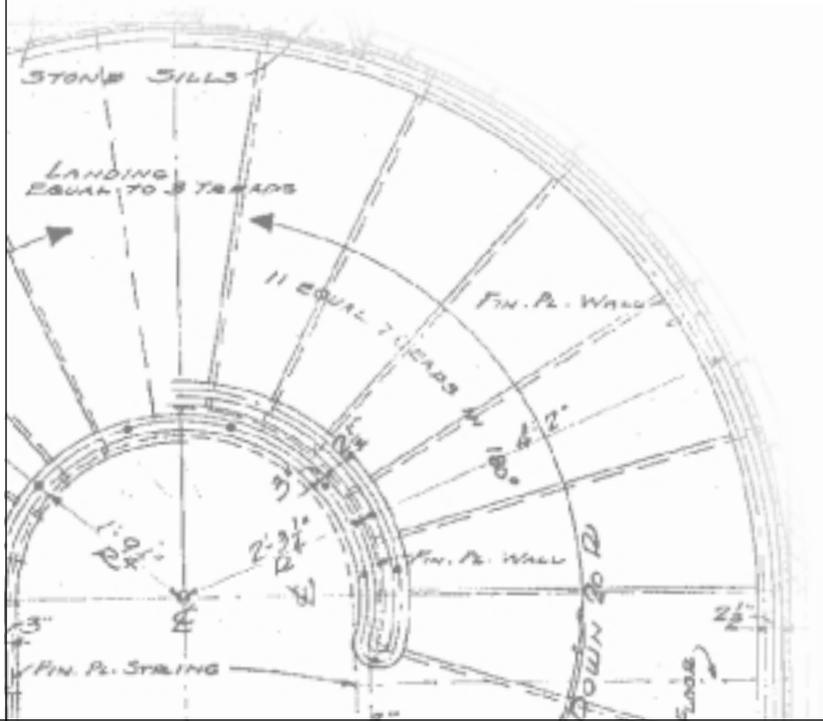


2002

UPDATE

45"



TO THE

BLUEPRINT FOR A GREEN CAMPUS

AN ENVIRONMENTAL ACTION PLAN FOR THE UNIVERSITY OF COLORADO AT BOULDER



BLUEPRINT FOR A GREEN CAMPUS

2 0 0 2

U P D A T E

The “Blueprint for a Green Campus” is an environmental action plan for a wide variety of issues that CU faces. The document articulates the vision of a growing, dynamic campus that steps lightly upon the earth and satisfies additional demands for energy, transportation, and resources through increased efficiency rather than increased consumption. The Blueprint builds upon CU’s existing environmental programs and accomplishments. To achieve sustainability on an institutional scale, the Blueprint for a Green Campus proposes the following goals:

- ▶ Creating a Climate-Friendly Campus
- ▶ Growing without Increasing Traffic
- ▶ Creating a Safe and Healthy Campus
- ▶ Green Campus Consumption and Disposal Habits

The 2002 Update to the Blueprint for a Green Campus serves to check in on progress toward these four goals. The Campus Earth Summit will be an opportunity to discuss these issues.

BLUEPRINT FOR A GREEN CAMPUS

2002
UPDATE

THIS PUBLICATION IS PRODUCED BY



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C E N T E R

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VIEW THE BLUEPRINT FOR A
GREEN CAMPUS ONLINE AT
[WWW.COLORADO.EDU/ECENTER](http://www.colorado.edu/ecenter)

Design and Layout by Jordan Lewin

2002 CAMPUS EARTH SUMMIT AGENDA

U N I V E R S I T Y O F C O L O R A D O

W E D N E S D A Y , A P R I L 1 7 T H

UNIVERSITY MEMORIAL CENTER, UNIVERSITY OF COLORADO AT BOULDER

REGISTRATION, CONTINENTAL BREAKFAST

8:30-9:00 AM UMC 235

RECYCLING

9:00-10:50 AM UMC 215

Presentation and discussion on the components of a successful campus recycling program.

TRANSPORTATION

9:00-9:50 AM UMC 425

Presentation and discussion on campus transportation demand management strategies.

GREEN BUILDING

10:00-10:50 AM UMC 425

Presentation on campus, municipal, and national trends in green building.

ENERGY

11:00-11:50 AM UMC 217

Discuss how the CU campuses can advance energy efficiency, energy conservation, and green power purchasing.

E-WASTE AND FOOD WASTE

11:00-11:50 AM UMC 425

Discuss new regulations and opportunities to handle challenging materials like electronics and food waste.

LUNCH

12:00-12:40 PM UMC 235

Sessions will feature presentations by local and national experts and University of Colorado staff. More information on the sessions will be provided to registrants.

KEYNOTE ADDRESS: A Vision for Sustainability

12:40-2:10 PM UMC 235

George Bandy II is the Social Sustainability Manager at Interface Research Inc. and the former Sustainable Development Officer for the University of Texas-Houston. He will present a science-based, inspirational vision on how campuses can be efficient in their consumption of energy and natural resources. He will give listeners insight into the ways in which universities can develop, educate, and support operations that minimize negative repercussions on society, the economy, and the environment.

PURCHASING

2:20-3:30 PM UMC 245

Presentation and discussion on procurement strategies for environmentally-friendly products.

PESTICIDE USE

2:20-3:30 PM UMC 425

Learn about safe, effective and preventative indoor and outdoor Integrated Pest Management strategies.

THE NEXT STEPS

3:40-4:30 PM UMC 215

Discuss how to coordinate environmental policy and programs among the four CU campuses.

YOUR CHOICE OF THREE FIELD TRIPS

4:30-5:30 PM MEET AT UMC SOUTH TERRACE

- ♦ **Recycling:** See the campus recycling collection system and tour the CU-Boulder Intermediate Processing Facility.
- ♦ **Transportation:** Visit a variety of campus-community transportation modes including bicycle paths, pedestrian underpasses, and the community transit network.
- ♦ **ENVIRONMENTAL HEALTH AND SAFETY:** Tour the new CU-Boulder Chemical Treatment Facility which features silver recovery, neutralization, and oxidation applications.



REGISTRATION DETAILS

The Campus Earth Summit is free of charge. If you plan to attend, please fill out our online registration form at

www.colorado.edu/ecercenter no later than **Wednesday, April 10th**. For more information or for maps and directions, visit www.colorado.edu/ecercenter, call (303) 492-8308, or eMail ecercenter@colorado.edu.



Table of Contents

	Page
Introduction	1
Creating a Climate Friendly Campus	8
Growing without Increasing Traffic	12
Creating a Safe and Healthy Campus	
Part I: Minimizing Hazardous Waste	20
Part II: Minimizing Exposure to Toxic Chemicals and Pesticides	25
Greening Campus Consumption and Disposal Habits	
Part I: Purchasing Environmentally-Responsible Products	34
Part II: Capping Waste going to the Landfill at 2000 Levels	41
Greening Building Design and Construction	47

Introduction

In April of 2000, the University of Colorado Environmental Center released the *Blueprint for a Green Campus*. To quote the introduction to the Blueprint:

“Building on the environmental successes at CU over the last two decades, we propose a vision of a growing, dynamic campus which steps lightly upon the earth and satisfies additional demands for energy, transportation, and resources through increased efficiency rather than increased consumption.”

The Blueprint lays out challenging goals in the areas of climate change, transportation, health and safety, and disposal and consumption habits.

The *2001 Update to the Blueprint for a Green Campus* was released last spring as a check-in on the Blueprint. Now the *2002 Update* seeks to answer questions on support for the Blueprint goals, what progress has been made toward the goals, obstacles to further progress, and newly emerging issues.

The major campus departments have reported on their progress on working toward the goals set forth in the Blueprint. Information from the departments is incorporated throughout the 2002 Update. The complete reports as submitted by Facilities Management, the Housing Department, Environmental Health and Safety, and Parking and Transit Services are available at www.colorado.edu/ecenter, by clicking on the “Blueprint for a Green Campus” icon.

The Blueprint has been formally endorsed by two major campus bodies: the University of Colorado Student Union and the Boulder Faculty Assembly. The Blueprint was also recognized by the United States Environmental Protection Agency, which issued a Year 2000 Climate Protection Award to the Environmental Center for the creation of the Blueprint.

The Chancellor's Executive Committee reviewed the *Blueprint for a Green Campus* in spring 2000, and set up a Blueprint Committee, chaired by the Vice Chancellor for Administration. The committee has met quarterly to review the proposed goals, and to make recommendations to the Chancellor on implementation steps. The committee has not yet discussed all of the areas in the Blueprint, and has made few formal recommendations. One area of active discussion is whether the committee should be replaced by another, more formalized council, in order to more effectively advance these issues.

One highlight this year is that the committee did recommend adoption of an Integrated Pest Management Policy, which has now been formally adopted for the Boulder campus. The policy sets forth general direction on pest management and pesticide use and designates a campus IPM coordinator who will review departmental plans for compliance. Details can be found in the "Creating a Safe and Healthy Campus" section of this document.

Progress during 2000-2001

There are a number of major accomplishments that are worth highlighting in this introduction.

Institutional and Structural Issues:

First, in the arena of "accounting for true costs", the Blueprint recommended that the campus marketplace be adjusted to send the right price signals. Currently, the campus marketplace often encourages excess resource consumption, through practices such as 'free' printing in computer labs, un-metered energy use by campus departments, and parking prices which treat the land under parking lots as free.

Last year, Housing eliminated free printing from computer labs in the residence halls, instead charging individual users. In the first year of implementation, Housing estimates a 55% reduction in paper use.

The campus Information Technology Council is currently considering the issue of pay for printing in the public computer labs on campus. The IT council created a Pay-for-Printing Task Force "to determine appropriate printing solutions for the campus public and student-based printing. The goals of the ideal solution are to:

- Contain printing costs for the campus
- Provide fair and equitable access to print services for all campus constituents
- Reduce waste by providing a financial incentive to conserve resources" (language from the draft report of the taskforce)

If this is adopted, it could lead to a very significant decrease in campus paper use, by sending the appropriate market signals to individual users. More information can be found in the section on "Greening Campus Consumption and Disposal Habits".

Another recommendation involves more consistent and accurate monitoring of campus environmental performance. Progress on this front includes the required reporting and tracking of campus pesticide use as per the Integrated Pest Management policy.

The Blueprint also recommends the creation of a formal campus environmental council. The Blueprint Committee has partially served this role. In addition, a network of staff whose job responsibilities cover environmental operations has become established. The Housing department created a new position a year and a half ago dedicated to recycling and environmental management. This is a major step forward, as there is now an institutional voice within that department. It is interesting to consider the broader context that Facilities Management created an environmental operations supervisor position 3 years ago, and Parking and Transit Services created a transportation modes coordinator position 2 years ago. This means that all of the major operational departments on campus now have dedicated staff paying attention to environmental issues. These staff meet and communicate quite regularly, forming an informal network of environmental managers on campus.

However, there is still a need for an effective council to help the campus address major environmental policy issues. It may be important to create such a council as a successor to the ad hoc Blueprint committee. This is conceptually supported by commitments adopted by the

campus. The Talloires Declaration, signed in 1997 by Chancellor Park, commits the university to " convene university faculty and administrators with environmental practitioners to develop curricula, research initiatives, operational systems, and outreach activities to support an environmentally sustainable future." Interestingly, 24% of the universities surveyed by the National Wildlife Federation and the Princeton Research Associates in the *2001 State of the Campus Environment* have campus environmental councils. The survey can be viewed at <http://www.nwf.org/campusecology/>. It should be noted that the survey rated the University of Colorado Boulder campus near the top in recycling and transportation and did not rank among the top schools for environmental goal-setting and environmental policies.

The Vice Chancellor for Administration appointed a Campus Resource Conservation Committee this year, which is analyzing and making policy recommendations focusing primarily on campus energy use. This is a very important committee within this arena. The Vice Chancellor is also considering the creation of a cross-functional team as proposed in the Environmental Management System Guide. The team would be primarily made up of representatives from the major operational departments. Both of these committees would complement a campus environmental council. The UCSU Environmental Board adopted a resolution which endorses the formation of a campus environmental council. The resolution is attached as an appendix to this introduction.

Some interesting developments in the individual goal areas include:

Creating a Climate-Friendly Campus:

- The Vice Chancellor for Administration created a Campus Resource Conservation Committee which is developing policies designed to contain campus energy use.
- The Vice Chancellor for Administration adopted a campus goal to stabilize or reduce energy use per square foot of campus building. This is significant, as the campus energy use has been increasing significantly faster than building space.
- Facilities Management and the Environmental Center have developed a "Generation Green" campaign, which targets individual behaviors which affect energy use - turning off lights, activating energy saving modes on computers, etc. The program kicked off in November in six pilot buildings.
- Several administrators have raised the idea of having the Williams Village expansion purchase wind power from Excel Energy to demonstrate a commitment to emissions reductions.

Growing Without Increasing Traffic:

- With the addition of two new high frequency transit routes in January 2001, student ridership on local transit rose by 13.6% over 2000 levels.
- The planning process for the next two high frequency transit services has moved forward. The STAMPEDE and DASH services are scheduled to begin at the start of fall semester 2002. Both will serve the CU campus, with the DASH serving commuters on South Boulder Road and the STAMPEDE linking the main campus and East campus.
- A transportation study of the proposed Williams Village expansion is underway and will determine the appropriate mix of parking supply and transportation alternatives.

- Transportation Services has developed an Request for Proposals for on-campus car rental services for students. If the process is successful, starting in the 2002-2003 school year students will have access to automobile mobility without having to own a car.
- Several major projects are moving forward to provide housing for students on or near campus, which substantially reduces car travel. These include the private Village at Boulder Creek development, the conversion of the College Inn to student housing, and the development of up to 1900 new student beds at Williams Village.

Creating a Safe and Healthy Campus:

- The campus has adopted an Integrated Pest Management policy which formalizes a commitment to less toxic pest control.
- Facilities Management is conducting an inventory of all cleaning products to rank their toxicity.
- In its first eight months, Environmental Health and Safety's new waste treatment facility has rendered 18,600 liters of photo processing chemicals as non-hazardous waste, recovered 5,156 gallons of water, and realized over \$10,000 in actual cost savings. Neutralization of acid/base solutions has resulted in the reduction of 900 liters of potentially hazardous waste.

Greening Campus Consumption and Disposal Habits:

- UCSU allocated significant capital funding for expanding recycling in both the 2000 and 2001 academic years, and is now considering funding for the 2002 academic year. Facilities Management and Housing are working cooperatively with the Environmental Center to implement this aggressive expansion program. This has resulted in expanded recycling of cardboard in the residence halls and could lead to food waste composting.
- The UMC remodeling and expansion project has involved an extensive recycling and reuse effort. Over 2.5 million pounds of construction and demolition waste were diverted from the landfill during the expansion phase of the project. The renovation phase will continue this effort.
- The Pay for Printing issue previously referenced is a major factor in reducing paper waste.
- On December 8, 2001, the UCSU Legislative Council passed a bill regarding the paper consumption of all UCSU Cost Centers. The bill requires the use of 100% post-consumer copy paper for all standard printing and copying. This does not include copies on colored paper, bound print jobs or the use of letterhead. Letterhead, colored fliers and any major print job must utilize paper with at least 30% post-consumer content.

Green Building

While this is not an area referenced explicitly in the **Blueprint for a Green Campus**, the way we build our buildings has such a profound impact for so many years that the **2002 Update** has included a separate section.

- The University Memorial Center Expansion and Renovation Project prioritized sustainable design from the project's inception and has made exceptional progress in addressing indoor air quality, using recycled and renewable materials, conserving energy and natural resources, and reducing and recovering waste.
- The new construction planned at Williams Village raises some opportunities. The Request for Proposals to private partners did reference sustainable design in a number of areas.

- Housing's project review process now includes an environmental review of each project by the Environmental Coordinator.

Obstacles and Outstanding Issues

At the same time that there has been significant progress in some areas, there are still major challenges ahead. Some of the issues we face:

- Energy use continues to increase rapidly, with four to five percent annual growth rates. We will not be able to meet the climate goal without substantially slowing this growth rate.
- Increasing housing costs are leading to an ever larger percentage of university employees and students living outside of Boulder. Unless the university can build significant amounts of housing on or near campus, this trend will make it more difficult to meet the transportation goal.
- The University has not yet made a firm commitment to any of the goals proposed. This contrasts to schools like Stanford University or the University of Washington, which have committed to the transportation goal; or Tufts University, which has committed to the climate goal. While we can make some progress without a formal commitment to the goals, there are difficult decisions that will require policy guidance from the highest levels of the university administration. Without clear goals it will be difficult to resolve these issues.
- Finally, the physical growth of the Boulder campus means we must continuously reduce our per capita or per square foot use of energy, paper, and other resources in order to meet our goals. This is clearly technically feasible. As Amory and Hunter Lovins and Paul Hawken point out in *Natural Capitalism*, a 10-fold increase in efficiency is possible with today's technology. The real question is whether we have the political will.

Appendix:
**University of Colorado Environmental Board Resolution
Adopted 7 March 2002**

Whereas:

- The University of Colorado at Boulder has a long history of environmental leadership; and
- There is currently no comprehensive environmental council or committee which sets policy or makes policy recommendations to the campus chancellor; and
- Twenty-four percent of colleges and universities do have environmental councils; and
- CU Boulder is a signatory to the Talloires Declaration, which commits the campus to "convene university faculty and administrators with environmental practitioners to develop curricula, research initiatives, operational systems, and outreach activities to support an environmentally sustainable future"; and
- The *Blueprint for a Green Campus*, which has been formally supported by the UCSU and the Boulder Faculty Assembly, recommends the creation of a campus environmental council; and
- The committee set up by the chancellor to review the *Blueprint for a Green Campus* is ad-hoc, has a limited scope, and does not represent the full spectrum of campus constituencies and expertise.

Therefore

- The UCSU Environmental Board recommends that the Chancellor create a campus environmental council; and
- The Environmental Board recommends that the council include students, faculty, staff, and administrators, and include nonvoting members who are representatives from off campus local, state, and federal environmental agencies; and
- The Environmental Board recommends that the council be charged with developing proactive policies and implementation strategies to reduce the environmental impacts of the university; and
- The Board recommends that the council be charged to review and develop implementation strategies for the *Blueprint for a Green Campus*, develop implementation strategies for the environmental management section of the campus master plan, and recommend other policies that will contribute to the long term sustainability of the University of Colorado at Boulder.
- The Board recommends that the Campus Resource Conservation Committee, the Solid Waste Advisory Board, and the Hazardous Materials Advisory Board all serve as standing subcommittees of the environmental council. In addition, other subcommittees may be formed as needed.

Creating a Climate-Friendly Campus

The Vision:

CU commits to meet the emissions reduction targets of the Kyoto Protocol, which would reduce CU's greenhouse gas emissions by seven percent below 1990 levels by 2010.

Overview

This year has seen many successes on the energy front. The Campus Resource Conservation Committee (CRCC) was created, and is beginning to set campus wide goals and recommendations for reducing energy use on campus. The Generation Green campaign, a partnership between Facilities Management and the Environmental Center is the outreach aspect of CRCC, and has been focusing on 6 pilot buildings on campus to try to reduce energy use through education. In conjunction with this, Vice Chancellor of Administration Paul Tabolt has set a campus wide goal of reducing energy use per square foot (see attached news release). Additionally, UCSU became a founding member of the U.S. Environmental Protection Agency's (EPA's) Green Power Partnership, a new EPA voluntary partnership program. Partners in the program pledge to switch to using green power to provide a portion of their electricity needs, which UCSU has done through the student purchase of 2 million kWh of wind per year for the period 2000-2004.

The Environmental Center hosted a national conference on universities and climate change in January 2002. This highlighted a number of campuses which are leading the nation in energy conservation and in climate change commitments, including SUNY-Buffalo, Oberlin, and Tufts. Profiles of these efforts can be found on the Environmental center website www.colorado.edu/center, by clicking on the Clean Energy Now sidebar and going to the conference section. This year also saw a new record in campus commitments to wind energy, as a consortium of Pennsylvania universities agreed to purchase a significant percentage of the output of the new Exelon-Community Energy wind farm. The University of Pennsylvania alone agreed to purchase the output of 5 turbines - approximately five times the amount of wind energy that CU Boulder is purchasing. In addition, one new development is the use of emissions trading and the purchase of off site emissions offsets to meet campus greenhouse gas targets. Lewis and Clark University just became the first college to meet the Kyoto goals, after students voted by and 83% to 17% margin to purchase offsets from Climate Trust (www.nwf.org/campusecology/smithrelease.cfm).

Progress during 2001-2002

Generation Green:

Facilities Management granted \$15,000 to the Environmental Center to develop an education campaign on the benefits of reducing individual energy use, and tips on how to do so. Six buildings were chosen as pilot buildings: Business, Math, Environmental Design, Benson and

two residence halls (Kittredge West and Sewell). The 6 pilot buildings were chosen in order to try different techniques at each, and to identify which methods are most effective in decreasing energy use.

The baseline goal for this project is \$15,000 in electrical savings in the six buildings. This would be the equivalent of reducing electrical use in the 6 buildings by approximately 200,000 kWh of electricity over one year (November 1, 2001-October 31, 2002).

Some of the techniques used for the six targeted buildings are:

- Developing relationships with building proctors, custodial staff and ITS to deliver a consistent message.
- Creating Electrical Use posters for each of the six buildings, (eventually for all buildings) that state what the cost for electricity was in the building for the 1999-2000 fiscal year, and the equivalent amount of air pollution. (This idea was developed by Walter Simpson at SUNY-Buffalo).
- Creating large displays with fun facts about energy use and ways to reduce use on campus and at home.
- Stickers for light switches and computer monitors that say "When Not in Use, Turn Off the Juice!"
- General flyers to pass out during tabling, or in between classes, and at events on campus (includes some laminated flyers for bathroom stalls).
- Focus groups for students, faculty and staff to see what measures they think will work best to reduce energy use in their specific buildings.



Some techniques to reach the entire campus include the following:

- Ads featuring energy saving tips in the Registration Handbook and Recreation Center Guide
- Ads in the Hop and Williams Village busses
- Message display on the stadium scoreboard during football games
- Distribution of the Environmental Center's "Guide to Saving Energy"
- Ads in campus-oriented papers

There will be a report after 6 months of the campaign to assess the impact on energy use.

Facilities Management:

- The lighting upgrade that was approved last year for several campus buildings is now underway, with a completion date of August 2002.
- Physical Plant is acquiring lighter, more efficient vehicles. Facilities Management purchased nine new "alternative" vehicles in 00/01 including 4 Metro micro vans (gas), 3 Mitsubishi 's (gas), and 2 Club Cars® (electric). One Club Car was subsequently sold to the Athletic Department due to F.M.'s move to RL-2. The department now has a total of 20 alternative vehicles.

Housing:

- At the College Inn, boiler replacements have resulted in a conservative 50% energy savings estimate. Four large boilers were replaced with two smaller, more efficient ones, and the pumps were upgraded with energy-efficient models. Prior to replacement, the system design required the boilers to run all summer long, just to provide hot water. Now, the boilers are staged to operate only when there is demand. So in the summer, only one unit will be running to provide hot water.
- In Family Housing, low-flow showerheads are installed as bathrooms are remodeled.
- Approximately 150 Family Housing units have been retrofitted with fluorescent lighting to replace plug-in lamps. Additionally, over 5,000 compact fluorescent lamps have been installed throughout the three Family Housing areas. These measures have resulted in annual energy savings of approximately \$55,000. Incandescent lights were also replaced by T-8 fluorescent lamps in the Farrand Hall lobby.
- About 150 higher-efficiency refrigerators and stoves replaced older (on average 10-20 years old) appliances.
- Housing has a contract with a vendor to remove the CFC's from all refrigerators that require disposal. The refrigerators and the reclaimed CFC's are then recycled.
- At Marine Court, a domestic hot water loop will be added in July of 2002. This loop will provide hot water, and will allow for the steam line to be shut down four months out of the year. This is estimated to save approximately 20% in steam costs.
- Athens Court (48 units) will be retrofitted with individual zone controls to allow for more efficient heating.

Plans for the Upcoming Year

Generation Green:

- Expand education campaign campus wide. This is contingent upon funding being allocated by Facilities Management and the Vice Chancellor for Administration.

Administration:

- Continue to work with the Campus Resource Conservation Committee on creating guidelines for campus energy conservation and implementing energy saving projects.

Facilities Management:

- Facilities is planning to hire a new energy conservation officer. However, this is contingent on available funds.
- The 5-year plan for energy conservation includes installation of a dedicated high efficiency air-cooled chiller for process cooling in Ekeley Chemistry.
- Conservation for computers by the Information Systems staff:
 1. New Windows 2000 systems will have the monitor 'sleep' mode enabled before deployment. This means monitors appear to go blank after a certain time without activity. It can be easily 'awakened' by moving your mouse or hitting a key on the keyboard.
 2. Old Windows NT systems do not have a 'sleep' mode. These systems will be replaced during the continuous renewal/replacement process.

- Conservation for computers by hardware/software purchase and replacement:
 1. New systems will include flat-panel monitors, which consume up to 70% less energy when in use than old CRT (cathode ray tube) monitors.
 2. New systems will use Windows 2000 as an operating system.

Housing:

- Housing is looking at the financial feasibility and impact to the central co-generation facility of an energy-saving performance contract. Through a performance contract, an outside company invests in efficiency improvements. The contractor is then repaid with a portion of the resulting savings. The project is managed by an energy services company (ESCO), which oversees the installation and commissioning of equipment, and verifies the energy savings.
- Initial estimates indicate that Housing could reduce its electricity and steam consumption by 15% in the first year. The department is currently reviewing the cost-effectiveness of this potential \$4-6 million dollar investment. Assuming the project is given the green light, Housing will issue a request for proposals to select an ESCO, with project implementation starting sometime in the summer.
- Several administrators have raised the idea of having the new development at Williams Village powered by wind.

Obstacles

Although campus support for energy conservation measures seems to be at an all time high, lack of funding may be an issue.

Facilities Management's progress has been impeded by a disconnect with State Fleet, in terms of the availability and choice of alternative vehicles when replacing older State vehicles as State Fleet is not bidding on any alternative vehicles over 1 ton. However, Physical Plant replaced 2 existing trucks with Low Emissions Vehicles (LEV) in the Fall of 01 and is in the process of replacing 3 existing trucks with LEV's as well. The issue seems to be that State Fleet is concerned with its ability to re-sell alternative fuel vehicles.

Discussion Topics

- How can we expand the amount of wind power and other sources of renewable power that the University uses?
- What additional funding options are there for energy saving projects?
- How can the four CU-campuses work together in creating energy conservation policies?
- How can we ensure that the momentum towards reducing energy on campus will not be lost with turnover of students, staff, etc.? How can we make sure energy conservation is embedded in campus behavior and structure?
- Should the entire campus implement guidelines such as those laid out by Facilities Management Information Systems ?
- Are there additional opportunities to convert the campus vehicle fleet towards higher efficiency and lower emissions?

Growing Without Increasing Traffic

The Vision:

CU caps traffic at 2000 levels by growing in such a way that there is no net increase in single occupant vehicle trips by students, faculty and staff.

While this is the vision statement of the Blueprint, which has been endorsed by both the University of Colorado Student Union and the Boulder Faculty Assembly, it has not been formally adopted by the campus. The Blueprint Committee has discussed a modified goal such as, "CU will increase the percentage of trips taken in modes other than single occupant vehicles." The development of a Transportation and Parking Micro-master Plan, which is discussed below, may allow this goal to be refined.

In addition to the information contained in this chapter, Parking and Transportation Services has provided a detailed report, which is posted on the Environmental Center website at www.colorado.edu/ecenter, under the 2002 update to the Blueprint.

Financial Issues

One key factor affecting the mix of parking and transportation alternatives will be the finances of campus transportation. Because expansion of the parking supply requires building new parking structures, usually upon existing surface lots, the cost per net new space can exceed \$30,000. As more of the parking inventory shifts to structures, permit fees will have to increase dramatically. Thus, it may well be more cost effective to invest in alternatives. For example, the annual cost of the faculty/staff bus pass is \$1,125 per parking space left open due to the program. For comparison, the annual debt service to provide one additional parking space is \$2,723 (Appendix 1).

It is also important to remember that the price increases required to build more parking will reduce demand. It is possible for an institution to get in serious trouble by building more than the cost elastic demand for parking. As an example, the University of California at Santa Barbara has decided to expand its parking supply by building a parking structure on "Lot 3". In 2000-2001, parking permits cost \$35/month. However, the UCSB Parking and Transportation Committee projects that permit fees will have to be raised by approximately \$100/month over the next 5 years in order to cover the costs of the new garage. In the words of the Committee in their recommendation for the 2001-2002 rate structure, "There's some possibility that extremely high parking fees will lead to a substantial exodus to alternative transportation, a plus from an environmental standpoint, but a serious problem for supporting loan payments for the expensive

new garages; e.g., we could even face a "death spiral," in which high rates reduce permit demand leading to even higher rates, etc. The new rates will produce some information on elasticity of demand; should demand prove more elastic than we expect, we may have to rethink the strategy for the future." (UCSB 2001)

The most cost-effective scenario involves some combination of investment in new parking and some level of investment in transportation alternatives. This may require that parking rates be raised not only to pay the cost of providing any new parking that is constructed, but also to pay for a range of transportation alternatives.

This is not simply a theoretical construct. At Stanford University, this approach has allowed the university to add 5 million square feet of new building space with no net increase in vehicle traffic, and at a cost savings compared to a conventional parking supply approach. The University of California-San Diego planned to build 13 new parking structures over a 10-year period to accommodate expected growth. In response to an economic analysis, this has been modified to 6 structures plus TDM measures, eliminating 4,000 planned parking spaces at a net cost savings. Cornell University made the decision to invest in a transportation demand management program, rather than building the 3100 new parking spaces they were originally contemplating. In the ensuing 6 years, they only built 350 spaces. The Cornell transportation department estimates that the campus saved nearly \$12 million in the first six years of the program, compared to what would have been spent on an expanded parking supply (Eagan and Keniry 1998).

Progress during 2001-2002

In the last year, two important efforts have either been implemented or are close to implementation:

In January of 2001 three new high frequency transit services hit the streets - the JUMP, BOUND, and LEAP. These services were created by a partnership between RTD and the City of Boulder, with seed funding from the federal Congestion Mitigation and Air Quality program. The JUMP and the BOUND serve areas immediately adjacent to campus, and we have seen significant increases in student bus ridership due to these routes. According to RTD statistics (RTD 2002), student ridership on local routes grew from 822,148 trips in 2000 to 933,624 trips in 2001, a 13.6% increase.

The planning process for the next two high frequency transit services has moved forward. The STAMPEDE and DASH services are



scheduled to begin at the start of fall semester 2002. Both will serve the CU campus, with the DASH serving commuters on South Boulder Road and the STAMPEDE linking the main campus and East campus.

Next Steps

There are several campus planning efforts underway, which will have significant impacts in years to come.

Bicycle Facilities:

An ad hoc bicycle facilities improvement group made up of representatives from Parking and Transit services, Facilities Management, and the Environmental Center has been meeting to prioritize potential upgrades to campus bicycle facilities. However, given the current structure of transportation funding on campus, there is little money dedicated to bicycle improvements. The current discussions may lead to some funding for improved bicycle parking, but a dedicated funding source is probably required in order to fund significant improvements, such as the Pleasant Street bikeway.

Transportation and Parking Micro-master Plan:

Parking and Transit Services is beginning the process to develop a Transportation and Parking Micro-master plan. The city of Boulder is also in the process of updating the citywide Transportation Master Plan, so there may be opportunities for joint planning. The campus study may encompass the following elements:

- Develop a TDM plan for the campus.
- Conduct a survey on approaches to address a potential disparity between parking demand and parking supply. The circumstances around this issue have changed in light of both 1) elevated confirmation and retention rates resulting in more students than either Housing or PTS can accommodate, and, 2) proposals to further increase enrollments while removing additional parking supply.
- Develop a range of parking and transportation scenarios examining the interaction of a variety of parking supply and travel demand management/modal shift options for UCB. Continue development of CU Inter-modal Transportation and Information Center project, with bus station, bike station, Broadway and Euclid underpasses and TEA-21 TIP funding request.
- Examine the incentive structure created by the current parking pricing relationships.
- Develop a clearer sense of what it costs the University to serve one additional pedestrian, cyclist, transit rider, car-pooler or SOV user. If we set our pricing to reflect real costs to the University, to the extent that people respond to price signals, their choices will yield a more rational outcome for them and for the University.
- Develop both policy and funding sources to better support the capital investment and operating budget enhancements needed to implement the priorities established in the Master Plan's modal hierarchy.
- Create a pedestrian facilities development plan.
- Create a bicycle facilities development plan.
- Create a transit facilities development plan.

- Create carpooling, vanpooling and parking facilities development plans.

Williams Village Transportation Plan:

The university, in cooperation with the city, has begun an important transportation planning effort focused on the new student housing which is being developed at Williams Village. Up to 1900 additional student beds are planned at this site. Nelson/Nygaard Associates, consultants in multi-modal transportation, have been retained to conduct the study. The study is examining the appropriate mix of parking and transportation demand management strategies for this development. The study will examine a range of alternatives, from accommodating the maximum possible parking demand on site, to a strategy that maximizes the land available for housing and minimizes the land devoted to parking, instead concentrating on giving residents mobility without car ownership.

There are some interesting issues surrounding parking for residence halls. If parking is paid through rent, this will tend to increase the demand for parking compared to charging a separate parking permit fee. A survey of 23 colleges and universities performed in 2001 showed a range of parking permit fees charged to students living in residence halls, from a minimum of \$23/semester to a maximum of \$318/semester, with a mean of \$91/semester (Daggett 2001).

The decisions made about parking supply will have broad implications for the entire housing development. One major determinant of the land available for housing at a given site is how much land is allocated towards parking. If "free" surface parking is provided, a significant portion of the land set aside for housing may be used to house cars rather than students. The land required will be reduced if the parking is placed in structures, and will be reduced still more if demand is reduced by separating parking permit fees from the general rent.

There is a wide variation in the amount of parking provided for student housing. The University of California at Berkeley provides essentially no parking spaces - you simply can not bring a car if you live in a residence hall. Cornell University requires 0.15-0.25 spaces per student bed. Existing student housing at the University of Colorado-Boulder provides 0.37 spaces/bed, the university is considering providing 0.75 spaces/bed for new housing. At the high extreme, there are some schools which provide more than 1 space/bed. One study performed by Walker Parking Consultants of multiple universities from 1986-1995 showed an average of 0.48 spaces/resident student.

Since surface parking requires about 300 square feet of land per space (about 124 spaces per acre), we can calculate the land demand of these parking requirements. It can be a very significant percentage of the total land available. As an example, for 2 story buildings, assuming 250 square feet of living space per student, a school could fit 280 students /acre with no parking, 176 students/acre at 0.5 parking spaces /bed, and 128 students/acre at 1 parking space/bed (Litman 1999). Under this scenario, requiring 1 space/bed decreases the potential housing by 27% compared to 0.5 spaces/bed!

An alternative approach, of course, will be to provide structured parking. While this will decrease the impact of parking requirements on the number of units that can be provided, it will increase the impact on the price of the housing. We have seen that a parking structure will

typically cost \$10,000-\$20,000/space. If the cost of new residence hall construction is \$50,000/bed, then a requirement of 1 parking space per bed will add 20%-40% to the cost of the housing. If this is folded into the base rents, it will represent a significant increase in housing costs for all students - regardless of whether or not they own a car. If it is not included in the rent, and instead residents must rent a parking space, then the parking requirements should reflect the expected reduction in demand at this price.

An interesting approach which has been examined at a few institutions is based on the fact that very few students who live in student housing use their cars daily, but many students store their cars for occasional use and weekend trips. It may be possible to provide this type of mobility through an on campus car rental program that will rent to students, or by a "car-share" program. Easy access to rentals could be cheaper for many of these students than paying the real cost of a space in a parking structure.

On campus car rentals:

This leads to a fourth important planning effort, the plan by Transportation Services to create an on-campus car rental program, which will give students the ability to rent cars easily even if they are under 21 years old. To that end, starting in the fall of 2002, Transportation Services would like to implement a one-stop transportation service that will allow our "customers" (students) to rent vehicles for personal use in the hopes of reducing the number of personal vehicles on campus. They have developed a Request For Proposals soliciting bids from car rental companies. Some excerpts from the RFP describes the program:

"The University is requesting proposals from rental car companies to provide to members of the University community a full range of rental cars (compact through full-size), passenger and cargo vans, and hybrid electric vehicles such as the Toyota Prius. The primary use of the rental vehicles will be for personal use. The University Transportation Services department will also use the chosen vendor to supplement its vehicle fleet when additional vehicles are needed for University business purposes.

Transportation Services would like to implement a one-stop transportation service for its customers. Advertisements for publicity and promotion of rental vehicles through the Transportation Center and the chosen vendor will be placed in local campus publications and in the CU Directory.

The chosen vendor should provide pick up, drop off, and delivery of vehicles to and from driver's location and/or the Transportation Center.

The chosen vendor should provide the following types of vehicles: compact, intermediate, Jeep (or other SUV), Suburban (or similar) 2WD and 4WD, minivan, 15 passenger van, and cargo van. Also, the University is especially interested in having access to hybrid electric vehicles such as the Toyota Prius."

Off-campus planning projects affecting CU:

28th Street/US 36: One is the continued progress on developing a multi-modal approach to the 28th Street/US 36 travel corridor. The US 36 Major Investment Study recommended a commuter

rail along the Burlington Northern track from 33rd and Pearl in Boulder to Denver Union Station; bus rapid transit from the Table Mesa Park & Ride to Denver; a bikeway to Westminster; and additional general purpose lanes between Broomfield and Denver. The city of Boulder is extending this, in an effort to turn the 28th Street corridor from Baseline Road to Iris into a multi-modal corridor. The section immediately east of campus will be the first constructed. This area will see significant improvements for bicycles, pedestrians, and transit including an off-street bike and pedestrian path along the east edge of campus (from Baseline to Arapahoe), improved underpasses under 28th Street, and regional transit along 28th Street which will provide access to Williams Village and the east side of campus.

Longmont Diagonal: Another development is the plan to create high frequency transit service between Boulder and Longmont. This effort, led by the city of Longmont, would provide improved transit service for many students and employees who commute along the Diagonal Highway.

References

- John Daggett, "University Transportation Survey", City of Fort Collins Transportation Planning, 2001
- David Eagan and Julian Keniry, "Green Investment, Green Return: How Practical Conservation Projects Save Millions on America's Campuses", National Wildlife Federation, 1998
- Todd Litman, "Parking Requirement Impacts on Housing Affordability", Victoria Transport Policy Institute, 1999
- RTD, 2001 Key 5 Data, Feb 2002
- UCSB Parking and Transportation Committee 2001-2002 Rate Recommendation, <http://www.park.ucsb.edu/ptmemo.html>

Appendix: Comparison of faculty/staff bus pass and parking costs

Let's take a look at the economics of the faculty/staff bus pass program at the University of Colorado. This program allows each permanent faculty or staff member who is eligible for benefits to ride local and regional buses and light rail by showing their university ID. The program costs \$1,125 per parking space left open due to the program. For comparison, the annual debt service to provide one additional parking space is \$2,723.

How do we arrive at the cost per parking space left open? For CU, in the year 2001 the total cost of this program is \$393,400. This includes the cost of the contract with the Regional Transportation District, the cost of administering the program, and the marketing costs. The university conducts an annual survey to determine how parking behaviors have changed since the advent of the pass program in 1998. The result is that the average number of days each person parks on campus has declined from 2.81/week to 2.47/week, a decrease of 12%. There are 6,250 employees who are eligible for the program, so on an average weekday there are 425 fewer employees parking on campus.

Now comes a subtle point. This does not mean that there are 425 fewer physical spaces required. There are 2 correction factors that must be applied. First, not everyone parks for the entire day, so there is turnover in the same parking space during the day. For the University of Colorado, on the average 1.43 cars will use any given central campus space during one day. The other correction factor that must be applied is the desired occupancy ratio. If occupancy is close to 100%, then drivers will have a difficult time finding free spaces. For this reason campus parking managers generally target some lower occupancy rate. For C.U., this target is 85%. Then, if there are P fewer cars parking each day, a turnover ratio T and an occupancy target O, the actual number of parking spaces avoided (N) is $N=(P/T*O)$. In the C.U. example, this is $425/(1.43*.85)$, or 350 spaces. The cost per space avoided is then $\$393,402/350 = \1125 .

The annualized cost/net new space for a two level parking structure built on an existing surface lot, by comparison, is \$2,723. David Cook, the Transportation Modes Coordinator for Parking and Transit Services, calculated this costs as follows:

Number of spaces in new structure	295
Number of spaces in existing lot	147
Net number of spaces added	147
Cost per space for construction	\$12,000
Contingency & bond issue costs	\$3,000

Cost per space to build	\$15,000
Projected construction cost	\$4,422,871
Cost for interest	\$3,605,205
Total cost to build and finance	\$8,028,076
Annual debt service payments	\$401,403
Annual cost per added space	\$2,723

This is a striking result - *it costs two and one half times as much to accommodate an additional person parking on campus than to shift one person from driving to riding the bus!* The total annual savings to the campus from the faculty/staff bus pass program, compared to providing 350 net new parking spaces, is approximately \$550,000.

Creating a Safe and Healthy Campus

Part I: Minimizing Hazardous Waste

The Vision:

- CU reduces the amount of hazardous waste generated by the campus while maintaining the quality and quantity of research.
- CU continues to advance pollution prevention programs to reduce the quantity of hazardous material present on campus and to promote a safer working and learning environment.

Progress during 2001-2002 and Upcoming Plans

To augment CU Boulder's current waste minimization and pollution prevention programs, the Blueprint for a Green Campus proposed eight action steps towards minimizing hazardous wastes. For each step, the current status as of March 2002 is described. Also, Environmental Health and Safety has included a few new action steps towards waste minimization and pollution prevention.

Action Step: Based on a feasibility study, institute a central chemical procurement system.

Current Status: The EH&S Chemical Management Specialist met with staff from CU's Procurement Service Center to begin exploring a centralized system. A Request for Proposal was issued, unfortunately, the responses were not encouraging. However, EH&S is currently looking at other alternatives.

Action Step: Further advance 'Best Management Practices' already adopted by many laboratories and shops to maximize safety and minimize waste.

Current Status: CU-Boulder was asked to serve on a special commission sponsored and facilitated by the Howard Hughes Medical Institute. The commission is comprised of Federal/State regulators and representatives from each of the 10 EPA regions across the nation and will propose 'Consensus Best Practices,' for educational institutions.

The Best Practices project has been completed and a report of the findings was issued to Congress and the EPA. CU-Boulder's Environmental Health and Safety division (representing EPA Region 8) feel the next step in this process is for the EPA to acknowledge the best practices procedures in well defined regulations and guidance documents.

Action Step: Investigate the feasibility of applying an 'advanced disposal fee' to discourage bulk purchasing of chemicals.

Current Status: No direct progress has been made on this step within the past year. The concept, structure, and applicability of an advanced disposal fee will be discussed in the future.

Action Step: Further advance microscaling efforts. (Microscaling involves conducting experiments on a smaller scale thus reducing the quantity of hazardous substances use in experiments, manufacturing, and routine cleaning.)

Current Status: The efforts in this area continue and are ongoing. Many microscale experimentation efforts have proven successful and are in practice within Chemistry and other UCB departments. It is unknown how many labs currently practice microscaling and how many

could do so. Efforts should be taken to determine the extent to which microscaling is being practiced and to encourage and promote this practice among teaching labs on campus.

Action Step: Add a waste treatment specialist to the EH&S staff to run the waste treatment process and advise on waste minimization techniques.

Current Status: A waste treatment specialist position was established within EH&S and he oversaw the installation of treatment equipment at the Environmental Health and Safety Center. As described below, the environmental and economic impacts of this treatment facility have been significant. Ralph Bogle's expertise and ingenuity in this area has further enhanced EH&S' commitment to reducing the amount of hazardous waste leaving the Boulder Campus.

Action Step: Install new treatment options and technology at the new EH&S facility which will significantly decrease hazardous waste volumes.

Current Status: A waste treatment area within the EH&S Center has been equipped as a state of the art waste treatment facility. The initial aim has been silver recovery and organic waste ozone/UV oxidation. Between May 2001 and January 2002, the treatment of photo processing chemicals has resulted in 18,600 liters being rendered non-hazardous. This is equal to more than 89 drums and the recovery



of 50 troy ounces of silver. In addition, neutralization of acid/base solutions has resulted in the reduction of 900 liters (more than 220 gallons) of potentially hazardous waste. These processes have also resulted in the recovery of 19,500 liters (5,156 gallons) of water, returned to the city wastewater treatment facility. Actual cost savings, after preliminary start-up costs have been approximately \$10,400.

Action Step: Reduce photographic chemical waste by utilizing new technologies and procedures.

Current Status: In 1997, digital photo labs were established within UCB's Fine Arts and Publications Departments. These labs have proved a success both academically and environmentally and have significantly reduced the volume of photographic wastes generated on Campus. However, because photographic wastes still represent approximately twenty percent of hazardous waste volumes collected, one of EH&S' key treatment programs specifically targets the recovery of silver from these wastes.

Action Step: Establish a battery recycling program so that rechargeable and alkaline batteries are recovered for recycling.

Current Status: EH&S is planning a pilot program in consultation with Facilities Management, Housing, and the UCSU Environmental Center. The pilot will take place in selected residence halls during the month of April and will assess the volumes, composition of mixed battery waste, and the recovery rate. Based on the findings and effectiveness of the test program, up to thirty potential locations may be selected for a permanent program to collect most battery types (everything except unsealed lead-acid batteries).

Additional Progress by Environmental Health and Safety

- In February 2001, a Chemical Management Specialist position was established within EH&S. This employee has focused on developing a comprehensive chemical inventory and reference resource database. To date, she has inventories for the entire Chemistry Department. She will soon be completing this process in other departments. This database is web-based and will shortly be linked to the EH&S homepage for possible reference by emergency responders on campus. This will assist them in knowing what chemicals are where on campus, providing better knowledge in the event of an emergency. This employee is also assisting the departments in acquiring new chemical storage cabinets to provide additional chemical security as well as bolstering pollution prevention measures.
- The aftermath of September 11 has pushed campus security to the forefront. EH&S staff help in this effort by providing knowledge and training regarding security within labs on campus and encouraging the locking of labs when they are unattended and making lab personnel aware of their surroundings. The Chemistry Store has also strengthened its security procedures.
- Effective July 30, 2001, the definition of Universal Hazardous Waste was expanded to include Electronic Devices and Electronic Components as Universal Hazardous Waste items. The Colorado Department of Public Health and Environment made this change to address the ongoing disposal of heavy metals and toxic components derived from these items. Historically, these types of items have been processed as main stream waste and were sent to the various landfills throughout the state. Businesses are no longer allowed to do this under the current rule. This new definition will in effect force the increased reclamation and reuse of these types of items and will require a change in the way all University Departments handle, store, and dispose of electronic items and equipment. In accordance with the UCB disposal policy, all UCB departmental equipment and furniture is disposed of through Property Services. Disposal methods include replacement on campus, donation and public auction. Property Services is working closely with EH&S, CU Recycling and others to ensure proper disposal under the new regulations.
- EH&S is working on revising and updating the Generators' Guide to Hazardous Material/Waste Management. Updating this booklet is an effort in EH&S' ongoing goal of providing the Boulder Campus with current, reliable information. March 2002 is the target date of completion.
- EH&S and Facilities Management have completed stenciling interior building storm water drains on the main and east campuses, as well as about 90% of all the hard-scaped exterior storm inlets (161 emblems). The best ways to mark turf and grassy areas are still being discussed.
- EH&S has worked with the campus to complete implementation of most of its Spill Prevention Control and Countermeasure Plan (SPCC) for above-ground petroleum tanks and emergency generators. This includes secondary containment, berms and spill prevention

equipment. Full campus implementation is expected by June 2002.

- To help improve water and air quality and reduce water consumption, 6 new specialized vacuum pumps were installed in Ekeley and Cristol Chemistry at a cost of more than \$30,000, replacing water aspirators that were used to distill solvents. Unlike the aspirators, the new pumps do not use running water (was a wasteful environmental practice), do not use oil (which became hazardous waste), nor do they allow residual solvent vapors to be entrained into the sanitary sewer drains.

Additional Progress by the Housing Department:

- Housekeeping converted to a new line of cleaning products, which are less toxic and corrosive. This allowed for the department to reduce its inventory of cleaning products from 250 to 75. In 2001-02, this system saved about \$16,000 per year.
- Housekeeping purchased cleaning rags made by 3M, which, due to the fiber and the weave, clean without any cleaning chemical—just water is needed.
- All spent fluorescent lamps containing mercury (those that are not green-tipped) are disposed of by Facilities Management through an EPA-approved lamp recycler.
- Housing is assessing the costs of providing a computer/electronic recycling program for its residents with Eco-Cycle, and may offer a program next fall. This type of waste generated in the residence halls is currently exempt from the State's universal hazardous waste regulations. This means that these items may be disposed of in the trash dumpsters, but Housing is seeking a reuse/recycling alternative.
- Working with EH & S, Housing will participate in a pilot household battery recycling program starting in April, 2002. Batteries will be collected in April from selected residence hall main offices. The costs for providing this program in the halls will be assessed to determine if a permanent program is feasible in the residence halls.
- All batteries generated by Housing Services--i.e., those from cell phones, palm pilots, hand-held tools, smoke detectors in Family Housing—are collected from the Housing Maintenance Service Center by EH & S.

Additional Progress by Facilities Management:

- A state-of-the-art membrane filtration waste-water treatment plant was installed at the Mountain Research Station. The \$1 million system utilizes a combination of membrane filtration and U.V. decontamination. The plant was commissioned in May 2001 and is currently in operation.
- Facilities Management continues to research and implement use of less toxic paints, finishes, and adhesives for use by the East and West zones as well as the paint and Carpentry Shops. Paint shop employees have been trained to enable them to review current and future painting plans. Campus standards now require "the lowest volatile organic compound (VOC) content possible" for each particular application, i.e. paints, stains, urethanes, etc. The paint shop has expanded use of water-based polyurethane and continues to research better products. Environmental Services is currently reviewing and rating all cleaners and disinfectants used by custodians based on toxicity. To date, 158 cleaners have been reviewed and ranked.
- Physical Plant completed a storm water drain assessment and re-routed the worst five illicit storm drain connections to sanitary sewer, including drains in Engineering, Duane Physics, and Chemistry.

- Several cooling tower and outdoor fountain drains have been re-routed to sanitary sewer at a cost of \$15,000.
- Fluid labs in Engineering were also re-piped to sanitary sewers at a cost of \$40,000.
- Facilities Management is currently working on a more complete mapping of drain network and emergency contingency plans. This involves linking catch basins to the next manhole in the system and then to the next outfall to the creek. The primary use of this will be to trace a pollution stream back to the source but can also be used to determine where a pollutant will enter the creek.
- Facilities Management funded a manhole audit to determine the condition of existing manholes and inlets; \$12,500 for sanitary and \$20,000 for storm. The sanitary audit should be complete by June 2002. The storm audit will commence shortly thereafter. This project also includes working with the city to create a uniform numbering system that can be used by both entities. Once complete, an additional funding proposal to repair deficiencies will be put forth.
- \$35,000 was funded in FY01/02 to install CFC monitors in the RL-3 and Education chiller rooms. The previously installed Engineering monitor was also repaired with this money. The refrigeration shop has identified 8 other chiller rooms needing monitors.
- Facilities Management is currently working with the State on a voluntary chloro-floro carbon (CFC) audit of campus to assure complete compliance with CFC regulations.

Creating a Safe and Healthy Campus Part II: Minimizing Exposure to Toxic Chemicals and Pesticides

The Vision:

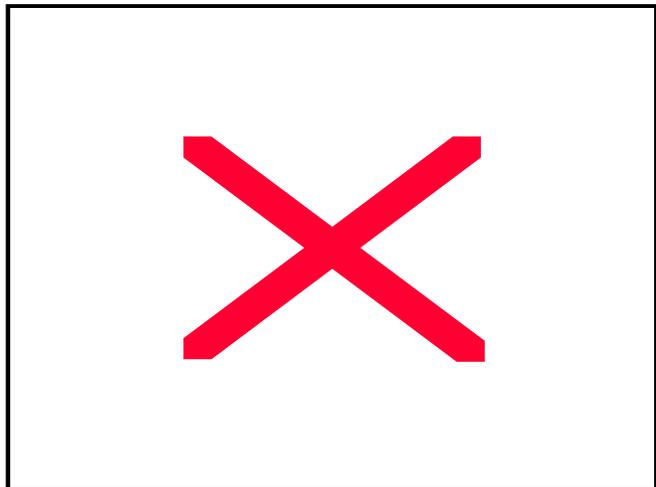
- CU significantly reduces the use of harmful chemicals and volatile pesticides in buildings and grounds management through integrated pest management.
- Campus buildings provide high indoor air quality through improved ventilation and control of indoor air pollution sources.

Progress toward Integrated Pest Management during 2001-2002

CU has practiced Integrated Pest Management (IPM) for the past two years and, as of March of 2002, CU-Boulder adopted a campus-wide pest control policy formalizing the current IPM program and establishing procedures for indoor and outdoor pest control. Key campus individuals representing the administration, Facilities Management, Housing, the Environmental Center, and Environmental Health and Safety were actively involved in developing the pest control policy for over one year. The policy is attached at the end of this section.

Facilities Management has made the following progress in reducing chemical and pesticide use.

- Environmental Services hired a permanent IPM technician in April 2000. The position focuses on least-toxic pest control with the least potential for exposure to humans and the environment.
- Physical Plant is currently pursuing an additional FTE to be split between structural IPM and the Integrated Weed Management (IWM) program.
- Pesticide spraying has been eliminated in all interior general fund spaces as well as in auxiliary spaces by using in-house IPM service.
- The grounds crew discontinued annual spring spraying of Elm trees for Elm Bark Beetle, the vector for Dutch elm disease and moved to sanitation pruning and routine inspections of trees. If chemical treatments are needed, they are applied in the form of soil injections.
- Grounds has experimented with use of Cashmere goats to graze noxious weeds on 12 acres at the Research Park for the control of knapweed and various thistles.
- Additional releases of seed-head and root-feeding insects were conducted on both the Research Park and South Campus properties in the summer of 2001.
- Grounds is currently developing an Integrated Weed Management plan for noxious weeds. Additionally, a GPS hand-held unit was purchased in January 2002 to assist in the mapping of all weed populations.



- Facilities Management took the lead in drafting the newly approved campus IPM Policy.
- Facilities Management co-sponsored the national 19th Annual Beyond Pesticides Conference in May of 2001 which took place at CU-Boulder.

Housing has made the following progress in reducing chemical and pesticide use.

- Housing will experiment with a corn gluten meal (CGM) pre-emergent treatment for dandelion control in the spring of 2002. CGM prevents seeds from germinating, and so, used over a period of several years, will help reduce the number of dandelions. An added benefit of using CGM is that it is 9% nitrogen in a slow-release form, being more available to the grass than quick-release, synthetic fertilizers.
- This summer, Housing will also experiment with a slow-release, alfalfa-based fertilizer to replace the high-nitrogen, quick-release type used in the past. Quick-release fertilizers tend to be lost to evaporation and run-off, making them more expensive and less effective. In addition, the high nitrogen residual gets carried into waterways where it can create a chemical imbalance.
- Housing continues to use the integrated pest management (IPM) services offered through Facilities Management for structural pest control. Additionally, the Assistant Director of Housing Services and the Environmental Coordinator issued a department-wide memo stating Housing's policy against using or purchasing pesticides.

Progress toward Improving Indoor Air Quality during 2001-2002

Facilities Management has made the following progress on improving ventilation and controlling indoor air pollution sources.

- Environmental Services has begun the process of phasing out the use of upright vacuum cleaners in lieu of more ergonomically correct canister and backpack vacuums that do not emit as many particulates into the air. Of the 266 total vacuums used, 138 are currently either a canister or backpack type, with 112 having been purchased since May of 2000. 34 of these were purchased since May of 2001.
- Facilities Management Planning and Physical Plant participate on the IAQ Response Team to react to indoor air quality concerns and complaints. Through careful studies and smoke testing, this team was recently able to resolve significant IAQ problems in the Electrical Engineering wing without the need for costly new equipment.
- Facilities Management is performing minor upgrades to campus ventilation systems such as balancing and improving ventilation of fume hoods, removing obstructions, and improving make-up air. \$12,000 was funded in FY01/02 for fume hood balancing as needed.
- \$35,000 was funded in FY01/02 for significant improvement to Fine Arts duct work and ventilation system including removal of unused fume hoods, improving fans, lowering of exhaust drops to sit directly over emissions sources, and adding exhaust vents to photo lab hazardous waste SAA.
- Facilities Management performed major upgrades to ventilation systems through deferred and controlled maintenance projects. These have included significant improvements in Chemistry (fume hoods), Imig Music (raising of fresh air intakes from street level), the Grounds Building (emissions exhaust system and HVAC improvements), and Environmental Design (raising of air intakes).

- Other projects are in the planning phase. These include: a \$2.3 million project in Chemical Engineering currently in Construction Document phase; an additional \$1.5 million for improvements to ENVVD; improvements to Chemistry/Biochemistry; and \$80,000 is funded for improvements to the Ramaley cadaver room ventilation system.
- Environmental Services currently reviewing and rating all cleaners and disinfectants used by custodians based on toxicity. To date, 158 cleaners have been reviewed and ranked.
- Facilities Management purchases and uses of low/no VOC paints, finishes, and adhesives.

Next Steps and Discussion Topics

- **Conduct education about campus IPM policy and procedures**
To promote preventative measures and awareness of the campus IPM program, the Environmental Center developed and distributed fact sheet fliers for lab, kitchen and office areas. There is a strong need to develop additional materials educating campus users about IPM efforts and procedures. Plans are underway to print a general brochure. Other outreach and education services could include presentations to building users, building displays, and appropriate signage posted in outdoor areas. An IPM education plan should be developed after determining the best outreach means.
- **Implement the IPM policy and procedures**
As laid out in the policy, duties and responsibilities are to be assigned to and enacted by various campus departments, personnel, and contractors. All departments are to utilize integrated pest management methods.
- **Restrict the use of the most harmful pesticides and chemicals**
Although the pest control policy outlines IPM criteria, it does not specifically limit the more harmful pesticide applications which include the use of pesticides in aquatic areas, the use of persistent chemicals which pose a long term threat after application or which bio-accumulate in fatty tissue, and the use of compounds in EPA toxicity categories I and II. Initial review of potential chemicals should begin with the least toxic compounds, i.e. chemicals in EPA Toxicity Categories III and IV. The use of compounds in EPA Categories I and II should be avoided if possible or used as baits or soil/trunk injections where exposure to the active ingredient is limited. The Blueprint for a Green Campus Committee could consider strengthening the policy and/or the campus IPM coordinator should review the use of these chemicals and the potential alternatives when reviewing departmental IPM plans.
- **Complete the toxicity ranking information on cleaners and disinfectants and consider recommendations to purchase and utilize the products of lesser toxicity where feasible.**
- **Address future plans for outdoor integrated pest management to safely and effectively control broadleaf weeds.**

Appendix:
**University of Colorado at Boulder
Policy and Procedure**

Topic: Pest Control
Reference: EP100
Issue Date: March 12, 2002
Approved by: _____
Dave W. Wergin, Director, Environmental Health and Safety
Author(s): Dave W. Wergin, Director, Environmental Health and Safety
John Bruning, Director, Physical Plant
Distribution: Deans, Directors, Department Heads and Building Proctors

I. POLICY

It is the policy of the University of Colorado at Boulder that unwanted pests will be managed by all persons (faculty, students, staff and applicators) utilizing the following Integrated Pest Management (IPM) procedures.

II. DEFINITIONS:

Integrated Pest Management (IPM) - IPM is an effective and environmentally sensitive approach to pest management that relies on a combination of commonsense practices. IPM programs use current, comprehensive information on the life cycles of pests and their interactions with the environment. This information, in combination with available pest control methods, is used to manage pest damage by the most economical means, and with the least possible hazard to people, property, and the environment. IPM programs take advantage of all pest management options possibly including, but not limited to, the judicious use of pesticides.

Pests – For purposes of this policy, Pests are populations of living organisms (animals, plants, or microorganisms) that cause damage or interfere with the use of UCB facilities and grounds for human purposes. Strategies for managing pest populations will be influenced by the pest species and whether that species poses a threat to people, property, or the environment.

Pest Thresholds – Pest tolerance thresholds must be established and may vary by pest, specific location or type of land use. Each department having facility and land use responsibility will establish the pest threshold levels for their area of responsibility. Three distinct levels should be determined: *Injury Threshold*, at the point some injury begins or is noticed initially; *Action Threshold*, requires that action be taken to prevent a pest population from causing aesthetic, functional or economic damages; *Damage Threshold*, the level where

unacceptable damages are already occurring. Regular monitoring is essential to determine the pest levels relative to the established thresholds.

III. Operational Responsibility:

The Executive Director of Facilities Management has been assigned the responsibility of administering the IPM program for the Boulder Campus and shall designate a Campus IPM Coordinator whose duties will include:

- a. Develop, maintain and make available references to best IPM practices.
- b. Serve as the campus resource for IPM techniques and application procedures.
- c. Promote IPM practices and review departmental plans for compliance with campus policy.
- d. Maintain records to meet the requirements of regulatory agencies.

IV. Procedure

- A. Pest management services will be provided for all general fund academic and non-academic departments upon request through the appropriate Building Proctor to the Facilities Management Service Center @ 303.492.5522. Auxiliary departments may also request these services on a rechargeable basis.
- B. Auxiliary departments with responsibility for building or land use shall either designate a departmental IPM Liaison, who will be responsible for departmental IPM planning and pest management, or use Facilities Management pest management services.
- C. In accordance with this IPM Policy, the use of privately acquired pest control sprays (e.g., Raid, ant killers, etc.) will not be permitted in or on University buildings or properties by non-pest management staff.
- D. The following IPM criteria must be applied to all campus pest situations when selecting treatment tactics and developing pest management strategies:
 - Determine pest threshold level.

Based on the pest threshold level, select a treatment that is:

- Least hazardous to human health;
 - Least damaging to the environment;
 - Effective at controlling the target pest;
 - Has minimal negative impacts to non-target organisms;
 - Within available resources.
- E. All University and commercial pesticide applicators must comply with the notification and posting regulations as stated in Colorado Department of Agriculture, Division of Plant

Industry, Title 35 Article 10 (35-10-112 Pesticide Applicators Act and Rules and Regulations Pertaining to the Administration and Enforcement of the Pesticide Applicators Act).

F. Each University or commercial pesticide applicator shall provide a legible record of application and related Material Safety Data Sheet (MSDS) for all pesticides used on campus to the appropriate departmental IPM liaison(s). These records shall include:

- Targeted pest;
- Time, date, location and climatic conditions of the application;
- Type and quantity and concentration of the pesticide used.

G. Departmental IPM liaisons shall submit these records on a monthly basis to the Campus IPM Coordinator who will serve as the record keeper of the program. Records will be maintained for a period of five years.

V. IPM Procedure and Responsibility Matrix

Responsible Person	Responsibility/Task
All General Fund Departments	<ul style="list-style-type: none"> • The Department of Facilities Management is responsible for managing pest problems for all General Fund Academic and Non-Academic Departments. • Contact the appropriate Building Proctor to report pest problems. They shall contact the Facilities Management Service Desk to initiate action.
Non-General Fund Departments (that have responsibilities for building or land management)	<ul style="list-style-type: none"> • Designate a Departmental IPM liaison or use campus in-house services; • Each Non-General Fund Department shall identify the types of pest problems specific to their areas and determine the pest threshold level for their properties.
Departmental IPM liaison	<ul style="list-style-type: none"> • The IPM liaison will be the departmental contact person for pest control; • Develop a departmental IPM plan, schedule pest control services as required and review pesticide application plans with the IPM Coordinator prior to any applications (except for baits and gels); • Identify and record the targeted pests, types, and quantities, times, dates, climatic conditions and locations of pesticides used. • Submit records of application, including MSDS for each pesticide used, to the Campus IPM Coordinator on a monthly basis.

Campus IPM Coordinator	<ul style="list-style-type: none">• Utilize IPM methods to provide pest control services to all General Fund and other requesting departments in a timely and cost effective manner;• Promote and educate Campus Community on the criteria and merits of IPM;• Determine the cost of implementing and maintaining the IPM program;• Develop funding strategies/resources for the program;• Train IPM Liaisons and serve as a campus resource to other departments on IPM techniques, policy and procedures;• Create a template for a standard campus IPM plan, maintain and make available, upon request, references to best IPM practices;• Collect and review departmental plans, prior to application (except for baits and gels), for compliance with campus policy;• Act as the official record keeper for the campus IPM program;• Prepare an annual report, for appropriate distribution, on the status of the IPM program.• Report non-compliant applications to the Director of Physical Plant and to the Director of Environmental Health & Safety as soon as detected.
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<p>All applicators (including Contractors)</p>	<ul style="list-style-type: none"> • Notification and Posting of Pesticide Usage - all University and commercial pesticide applicators must comply with the notification and posting regulations as stated in Colorado Department of Agriculture, Division of Plant Industry, Title 35 Article 10 (35-10-112 Pesticide Applicators Act and Rules and Regulations Pertaining to the Administration and Enforcement of the Pesticide Applicators Act). • All applicators shall provide the departmental IPM liaisons a proposed method of treatment and pesticide use plan for review prior to any application. • Record Keeping - each University or commercial pesticide applicator shall provide a legible record of application and MSDS for all pesticides used on campus to the departmental IPM liaisons. These records shall include: <ul style="list-style-type: none"> (a) Targeted pest; (b) Time, date, location and climatic conditions of the application; (c) Type and quantity and concentration of the pesticide used. • Departmental IPM liaisons shall submit these records on a monthly basis to the Campus IPM Coordinator, who will serve as the record keeper of the program. Records will be maintained for a period of five years.
<p>Contractors (must be licensed commercial applicators)</p>	<ul style="list-style-type: none"> • All commercial pest control contractors must comply with the University of Colorado at Boulder IPM policy and procedures. • All commercial applicators must be properly licensed by the Colorado Department of Agriculture
<p>Procurement and Storage Personnel</p>	<ul style="list-style-type: none"> • Only qualified Chemical Applicator Supervisors licensed with the Department of Agriculture shall have authority to purchase pesticides. • All pesticides shall be stored in compliance with Colorado Department of Agriculture Rules and Regulations, Title 35, Article 10 Part 11.
<p>Design and Construction personnel for ALL UCB facilities</p>	<ul style="list-style-type: none"> • Pest exclusion and prevention shall be a design consideration for all construction, renovations and landscape modifications.

Greening Campus Consumption and Disposal Habits

Part I: Purchasing Environmentally-Responsible Products

The Vision:

CU adopts an environmentally-preferable purchasing policy which will institute standards for environmentally responsible purchasing.

Progress during 2001-2002

There has been significant progress by a number of campus departments, but not institutional progress on the goal of establishing an environmentally preferable purchasing policy for the CU-Boulder campus.

Recycled Paper Purchasing:

The largest progress in this arena was made by the student union, UCSU. On December 8, 2001, the UCSU Legislative Council passed a bill regarding paper use by UCSU Cost Centers. The bill requires the use of 100% post-consumer copy paper for all printing and copying. This does not include copies on colored paper, bound print jobs or the use of letterhead. Letterhead, colored fliers and any major print job must utilize paper with at least 30% post-consumer content.

The UCSU Executive branch strongly supports this policy. Research into the feasibility of this change was extensive. The basis for the bill came from the 2000-2001 Cost Center Paper Product Consumption Reports. The information collected from these reports shows the feasibility of implementing this bill. Establishing a copy paper policy enables UCSU to exemplify responsible consumption to other departments and organizations on the Boulder campus. The bill is attached as an appendix to this section.

The UCSU executive staff prepared estimates of the budgetary impact of this requirement. The Cultural Events Board, Environmental Center, Recreation Center, UCSU Proper, Wardenburg Health Center, Women's Resource Center, Volunteer Clearinghouse and Legal Services already use 100% post-consumer paper for copy paper. For the other cost centers, the annual cost increases are minimal: Off Campus Student Services, \$3.32; UMC Total Increase, \$79.97; SOFO, \$27.20.

There are several brands of 100% post-consumer recycled copy paper that are high quality and cost competitive products. The most commonly used within UCSU is Eureka 100 and Eureka 30 (for colored paper). Additionally, the "office pak" recycled on the CU Boulder campus is used in the manufacture of Eureka 100. Therefore, by following this new policy, cost centers are "closing the loop."

UCSU also passed a resolution asking that the campus establish a policy requiring the use of copier papers containing at least 30% post consumer content, and higher recycled content when the price, quality and availability is comparable. The Blueprint Committee reviewed this recommendation at the March 2002 meeting and asked for additional research. The resolution is attached as an appendix to this section.

The issue of cost is important. Under current market conditions, 30% post consumer paper is available at a cost below that of much of the virgin paper used on campus. The cost of 100% post consumer paper is currently significantly higher - up to 60% higher than the lowest cost papers. However, this difference is a much smaller percentage of the overall cost of copies, because the cost of paper is a small fraction of the total cost of a copy. The maximum cost difference comes to about a third of a cent per copy, which is 3-5% of the cost of a copy - this is the actual cost differential of making a copy with 100% post consumer paper compared to making a copy with the lowest cost virgin paper.

Another area where there is significant potential is the use of paper in public computer labs. Information Technology Services, which runs the labs, has agreed to test the use of 30% recycled content paper in the labs, given that current market prices are actually lower than for the virgin paper they have been buying. In addition, the Housing department has expressed interest in converting to recycled paper in computer labs and other printing.

There is also an active investigation into converting from free printing to pay for printing in public computer labs on campus, in order to reduce costs and reduce the use of paper. One proposal made by the Environmental Center is to switch to high post consumer content recycled paper at the same time as any switch to paid printing. This would reinforce the environmental benefits of the switch, and would allow any cost impact to be absorbed in the price charged to users.

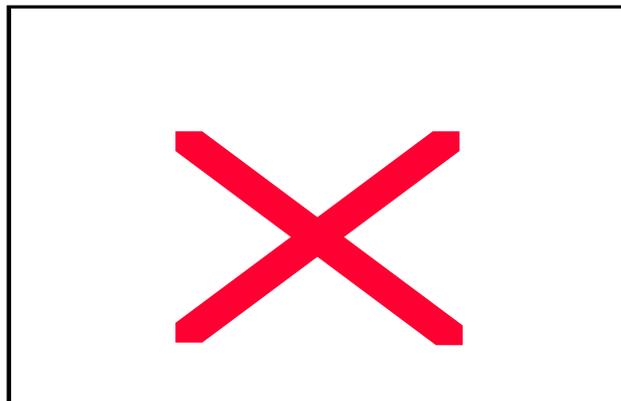
For context, another large institution in the area, the city of Boulder, is currently revising its environmentally preferable purchasing policy. The current policy as it affects paper requires the use of 30% post consumer paper. The revisions under consideration would require the use of 100% post consumer paper by city departments.

Recycled Content Office Furniture:

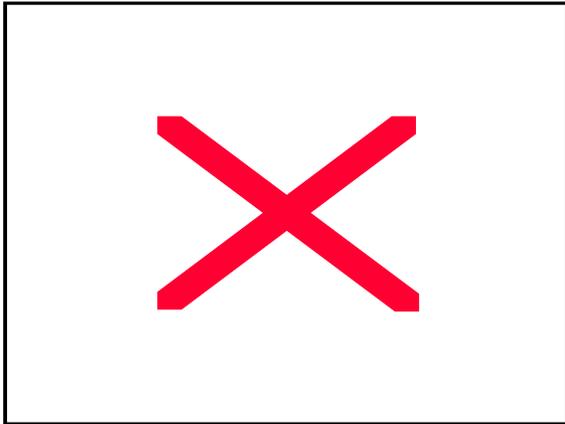
One interesting development on the purchasing front occurred this spring. UCSU authorized the Environmental Center to purchase high recycled content furniture for its offices in the new wing of the UMC. This furniture is not available through the existing state contract, and has not been previously purchased on campus. However, for the furniture needs of the Environmental Center, the recycled content bid was actually lower cost than buying conventional furniture from the state contract.

The furniture purchased includes:

- Desktops made from compressed agricultural waste
- A conference table top made of compressed agricultural waste with a wood veneer from a certified sustainably harvested forest
- Table legs made from cardboard carpet tubes
- Office dividers made from compressed newsprint and old tires



- Benches and chairs made from old plastic milk-jugs
- Chairs with upholstery made from 100% recycled polyester



The pictures show the appearance of the furniture. It can be viewed in person by visiting the Environmental Center in Room 355 of the UMC. There may be opportunities for other offices on campus to purchase similar furniture, and to consider a modification to the state contract to get such furniture offered.

Fair Trade Coffee:

Another development on the purchasing front is an effort by students from the Developing Areas Research and Training group to modify coffee purchasing decisions on campus. Based on their research, the UMC has agreed to begin offering "fair trade" coffee in addition to their existing coffee choices.

Progress by Housing:

- Recycled plastic picnic tables were used at Athens Park, a Family Housing area.
- Recycled carpeting was used in the entryway of the new Family Housing main office, and in the elevator at Marine Court. The product, made by Collins-Aikman, contains recycled content, and can itself be recycled at the end of its lifetime.

Flat Screen Computer Monitors:

The Campus Resource Conservation Committee issued a policy regarding the purchase of computer monitors. It is now mandated that Facilities Management purchase flat screen displays rather than CRT (cathode ray tube) monitors. This can reduce energy use by up to 70%. The committee recommends this energy-saving purchasing practice for other campus departments.

Outreach to Campus Departments:

The student outreach staff at CU Recycling have been conducting visits to campus offices to share information and make recommendations on a variety of environmental issues, particularly recycling, waste reduction, and environmentally friendly purchasing options. The Green Products Guide and updated recycled paper price, quality and availability information are distributed as part of a "green" folder containing a variety of campus environmental information. Staff have already visited and shared information with over 50 offices in 10 buildings.

Food Service Disposables:

The increase in "Grab 'n Go" dining will increase the amount of disposables used by campus food customers in the residence halls and the University Memorial Center. Housing Dining Services is testing plant-based, biodegradable plates which are manufactured by EarthShell. Students and Housing staff have conducted some research into the price, quality and availability

of recycled-content disposables and styrofoam alternatives. This information will be shared with food service managers later this spring.

Next Steps

The purchasing session at the Campus Earth Summit on April 17th will provide an opportunity to learn more about procurement strategies and to discuss the appropriate next steps with representatives from all four campuses and system-level administrators. Findings from this session will be shared with the Blueprint for a Green Campus committee.

Discussion Topics

- How can Procurement Services assist in tracking the amount of green products being purchased and in determining the price, quality and availability of the more environmentally friendly products?
- What would be an appropriate green procurement policy for CU-Boulder and/or the University of Colorado system?
- Which vendor contracts could be revised to include environmentally-preferable alternatives?

References

- Center for a New American Dream:
<http://www.newdream.org/procure/>
- EPA guide to state and local green purchasing:
<http://www.epa.gov/oppt/epp/pdfs/statenlocal.pdf>

Bill mandating 100% post consumer paper use by UCSU cost centers:

November 29, 2001

56 Legislative Council Bill #1

University of Colorado Student Union

Sponsored by:

Vanessa Luxen
Zach Colbert

Rep-at-Large
Senator

Authored by:

Carina Bernard-Walker

UCSU Environmental
Director

A BILL

BILL HISTORY

The University of Colorado at Boulder and UCSU lead the nation in implementing many important environmental programs. UCSU has expressed support for continuing to exemplify environmental standards for other universities and departments within CU Boulder. One important role of UCSU is the promotion and practice of responsible use of resources. In the past, the actions of UCSU have shown support for increasing their use of recycled products. Recycled paper products in the market now have similar quality and price of other products that contain less post-consumer recycled content. The 200-2001 Consumption Report results show the feasibility of requiring all Cost Centers to use only 100% post-consumer copy paper for all standard printing and copying. Currently, six of the UCSU Cost Centers use 100% post-consumer copy paper for all standard copying and printing. The estimated increased costs for the remaining Cost Centers is very minimal. Establishing a copy paper policy would enable UCSU to exemplify responsible consumption to other departments and organizations on the Boulder campus.

BILL SUMMARY

- Whereas:** the University of Colorado at Boulder has been, and continues to be an environmental leader.
- Whereas:** buying recycled products saves natural resources, energy, clean air and water, landfill space, money and creates jobs.
- Whereas:** high-quality and low cost brands of 100% post-consumer copy paper are readily available for purchase.
- Whereas:** six of the UCSU Cost Centers are currently using only 100% post-consumer copy paper.
- Whereas:** the cost of replacing current paper use with complete use of 100% post-consumer copy paper is minimal
- Whereas:** UCSU's support of a copy paper policy would encourage other departments and organizations within the University to reevaluate their paper use.
-

BE IT ENACTED by the Legislative Council of the University of Colorado Student Union, **THAT:**

- Section 1:** All UCSU Cost Centers must use 100% post-consumer copy paper for all standard printing and copying on white paper. Standard jobs do not include copies on colored paper, bound print jobs or the use of letterhead.
- Section 2:** Letterhead paper must contain at least 30% post-consumer content.
- Section 3:** Major print jobs, including colored fliers and any bound job, must utilize paper with at least 30% post-consumer content.
- Section 4:** This policy takes effect at the beginning of the 2002-2003 budget cycle.
- Section 5:** This bill shall take effect upon passage.

November 29, 2001 1st Reading

December 8, 2001 2nd Reading

Resolution asking the campus to adopt a 30% standard:

March 14, 2002

52 Legislative Council Resolution

University of Colorado Student Union

Sponsored by:

Zach Colbert

Senator

Authored by:

Carina Bernard-Walker

UCSU Environmental
Director

A RESOLUTION

RESOLUTION HISTORY

In 2000 the Environmental Center authored the Blueprint for a Green Campus, or an environmental action plan for the University of Colorado at Boulder. One important section of the Blueprint is Greening Campus Consumption and Disposal Habits. The first part of this section calls for the purchasing of environmentally-responsible products. One step towards achieving this objective is the purchasing and use of high post-consumer content copying and printing paper. UCSU passed a bill in December 2001 requiring all UCSU Cost Centers to use only 100% post-consumer content paper for all standard printing and copying. This UCSU policy expresses the feasibility of reducing the use of virgin paper on the CU Boulder campus. Currently, no campus wide policies concerning the use of high post-consumer content paper have been pursued.

RESOLUTION SUMMARY

- Whereas:** The Blueprint for a Green Campus commits to expanding the purchasing of environmentally responsible products for the campus as a whole.
- Whereas:** UCSU exemplified the feasibility of purchasing higher post-consumer content paper with the passage of 56 Legislative Council Bill #1.
- Whereas:** All Federal Agencies have been required to buy 30% post-consumer content copy paper since January 1, 1999.
- Whereas:** A study conducted by the Government Printing Office showed that paper with 30% post-consumer content performs just as well as virgin paper and paper with a lower recycled content.
- Whereas:** The price of 30% post-consumer content copy paper is currently less than or equal to high quality virgin paper and is available through current distributors on contract.
-

BE IT RESOLVED by the Legislative Council of the University of Colorado Student Union, THAT:

- Section 1:** UCSU recognizes the importance of expanding CU Boulder's purchasing of environmentally responsible products.
- Section 2:** UCSU urges the adoption of a campus wide policy requiring all campus departments to use a minimum of 30% post-consumer content paper for all standard copying and printing.
- Section 3:** In addition to the 30% post-consumer content standard, the highest recycled content paper should be purchased when price, quality and availability of products are equal.
-

Greening Campus Consumption and Disposal Habits

Part II: Capping Solid Waste Going to the Landfill at Year 2000 Levels

The Vision:

As CU grows, we will cap the amount of solid waste going to the landfill at year 2000 volumes by increasing recycling and composting efforts and by using market incentives, new technologies, and purchasing policies to reduce waste generation on campus.

Progress during 2001-2002

CU Recycling posted another record year of activity both in terms of tons collected and services offered. Student demand for additional recycling continued to drive CU Recycling's progress-aided by the second year of a four-year capital expansion campaign. The program continued to develop new approaches to meeting the Blueprint's goal with funding from Boulder County, the Colorado Office of Energy Management and Conservation, and the U.S. Environmental Protection Agency.

The program was challenged however, with declining revenues from the sale of recyclables and with the need to identify a site and begin plans for relocating the recycling facility.

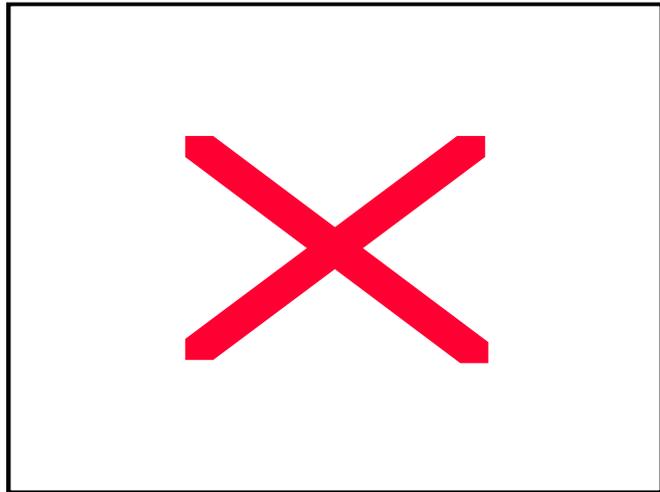
Student-Administrative Partnership:

- The Housing Department, Facilities Management and the Environmental Center successfully began collections of "Office Pak" from Family Housing courts.
- Residence halls and family housing courts now have automated collections of cardboard. Plans are in place to expand program further with additional funding from UCSU and Housing.
- The partnership continued to expand main campus collections of magazines and catalogs.
- The Grounds Department and the Environmental Center established collection of recyclables from outdoor recycling stations.
- Construction and Demolition (C&D) waste recycling and reuse efforts were expanded with the pilots of the UMC expansion and renovation project and the Hunter demolition. The Environmental Center and Facilities Management worked to determine potential for C&D recovery in the Grandview area.
- The partnership began development of a measurement system that applies an industry-wide formula for tracking and reporting waste diversion through recycling.

UCSU Environmental Center:

- The Environmental Center negotiated with the Boulder County Resource Conservation Division and Eco-Cycle for premium pricing of CU's pre-sorted materials. This project resulted in prices that, while lower than fiscal year projections, are significantly higher than other Boulder County recyclers are being paid.

- Continued Capital Expansion Plan. \$83,500 of capital funds was approved by UCSU in fiscal year 2000-01 to fund new recycling locations, distribute new outreach materials, and implement an automated cardboard recycling system. A second year of capital expansion was approved for 2001-02 which has or will soon result in additional containers, improved visibility and collections in the Housing department and classroom areas, more magazine & catalog containers, and textbook recycling.



Facilities Management:

- Facilities Management boosted central collection locations to 765 (from 650 in May 2001).
- Over 10,000 desk-side bins are now regularly serviced.
- Reusable office supplies/paper are back-hauled to campus departments as part of routine collection routes.

Housing:

- During the Farrand kitchen renovation, roughly 10 tons of construction materials were recycled or reused. These materials included doors, dimensional lumber, decorative wood, metal, light fixtures, and flagstone.
- In February 2001, Housing adopted a pay-for-printing policy in all of its computer labs. The program is estimated to be saving 1,800 reams of paper per year.
- The Cheyenne-Arapaho and Darley Commons dock areas were improved to allow for easier access to recycling containers.
- Housekeeping is converting to a new toilet paper roll design without cores. Additionally, this product is packaged in a plastic bag, rather than a cardboard box, saving transportation fuel costs. The bag may then be used by Housekeeping as a trash liner. This product conversion is estimated to save almost \$10,000 per year.
- In the fall of 2001, Housing began chipping its organic waste on-site for use on its grounds. It is estimated that about 200 cubic yards of organic material has been diverted from the landfill.
- Pallets are reused by a pallet recycler; the broken ones are chipped up by Housing and used for mulch.
- All scrap metal generated by Housing Services is recycled.
- Refrigerators were donated to the CU Community Closet, for use by the Special Education Departments at CU, Broomfield and Niwot High Schools, and Superior Elementary.
- Old smoke detectors (those under 2 years old and still in good condition) were donated to Longs Peak Energy Conservation, a weatherization agency that assists low-income families.
- About 250 old beds and desks were given to Salvation Army and the Boulder Shelter for the Homeless when furniture was replaced in Sewall Hall last summer.

Next Steps

There are several exciting issues relating to capping solid waste.

Food Waste Composting:

The Environmental Center, Facilities Management, and Housing are working to determine the feasibility of collecting food waste from all food service locations including the UMC, the residence halls, the University Club and the College Inn, for a total of 3-5 tons per day of waste. This is a major recyclable component of the waste stream that is not currently being collected. The partnership has applied for grant funding to purchase equipment for composting food waste on campus. If this is not funded, the backup plan is to collect the materials and haul them to a composting facility near Golden.

The Governor's Office of Energy Management and Conservation recently funded CU Recycling to analyze the possibilities of institutional food waste composting and publish a planning guide to share the results with the state. Student researchers have been compiling the technical and financial information for institutions like universities, hospitals, and correctional facilities to convert this waste to a value-added fertilizer. A state-wide composting summit was held on campus in March to discuss CU's findings and recommendations.

New Recycling Facility:

The Athletics Department is planning to build a new field house and parking structure East of the Stadium, on the site of the current recycling facility. While the timing of this project is uncertain, as Athletics has not yet raised all of the funds needed to build the new structure, eventually this will require the facility to relocate. This presents the challenge of identifying a site and designing and building a new facility, but also may present the opportunity for an improved recycling center, with the space and capability to recover additional materials. The Athletics micro master plan sets four principles -- that Athletics will pay the costs to relocate the facility; that there will be no interruption in recycling service; that the new site will be located to allow student access; and, that the new site will have room for room for planned expansion. A site selection process is currently underway to identify and prioritize locations.

Outdoor Recycling Locations:

The partnership is currently exploring the possibility of revising Grounds' trash collection program to maximize efficiency, reduce costs, and include recycling at selected outdoor trash locations.

Capital Expansion:

The UCSU capital expansion plan reflects considerable long-term planning to determine how best to cap the amount of solid waste entering landfills. The criteria which guide the expansion are: a) amount of recyclables diverted from the waste stream, b) visibility and convenience, c) ease of implementation, and d) cost-effectiveness. It is important to note that Facilities Management and Housing departments are interested in seeing recycling improve but are unable

to fund these improvements alone. Continued capital funding assistance from UCSU therefore, will continue to lever increased involvement from these departments.

The following projects are currently under financial consideration and in planning phases for implementation in 2002-2003:

- Food Waste Composting: As described above.
- UMC Cardboard Compactor: An upgrade to the current cardboard baler is necessary given massive cardboard volumes which result from the University Memorial Center food services serving over 3 million meals annually. A dual-chamber compactor unit, which will handle corrugated cardboard as well as trash, is the solution for limited dock space, reducing disposal costs, and increasing convenience for food service employees.
- Williams Village floor cabinets: The Williams Village residence halls have a specialized recycling system which involves a container on each floor for co-mingled containers and twice weekly doorside pickup of newspapers. Despite aggressive outreach efforts, residents and housekeeping staff are still confused about the system. Containers for various recyclable materials on each floor would provide a much more convenient and common-sense approach to Williams Village recycling. It is proposed that these improvements be split with the Housing Department and phased in over 2 years.
- Central station backboard signs for indoor locations: This new project is proposed due to the ongoing problem with containers being removed and/or displaced from their approved locations as well as with instructional signage affixed to walls only temporarily. Permanent signage will serve to establish the designated area for recycling containers and the space for affixing grade sheets which describe acceptable materials. We have identified 40 locations needing this type of information.
- Additional automated cardboard collection bins: In the past two years, 23 containers were sited at residence halls and family housing courts for automated cardboard collections. Ten additional containers are needed to complete the cardboard recycling program. Containers will be placed for special events like football games and at additional residence hall and family housing areas.
- Additional indoor interchangeable displays: We have identified 22 high-traffic locations to mount attractive posters in 10 academic building locations and 12 residence hall locations. 3 to 5 different messages will be produced so the posters could be switched around for a new look each semester.
- Marketing tools: Funding for student labor and supplies would go toward a project to make positive recycling and waste reduction messages available during previews of campus movies, on the loop TV in the renovated Farrand dining area, and on pre-lecture slideshows.
- Cardboard recycling stamp: To raise awareness that cardboard recycling is available, mail clerks can stamp "recycle this box" on incoming packages in the residence hall mailrooms and other high volume distribution areas. Capital funds will produce 20 refillable, reusable stamps.

E-waste:

The emerging problem of "e-waste" is also being addressed. The Environmental Protection Agency has funded the Environmental Center to recommend reuse and recycling options for computers and electronics. Regulations now require businesses and institutions to change their disposal methods for this toxic part of the waste stream. CU's President's Office, the

State Office of Economic Development, and the Corporation for National Service are assisting the project. While this is designed to provide recommendations to a broad cross-section of institutions, it should also provide useful guidance for the Boulder campus.

Economic Incentives to Reduce Paper Waste:

As referenced in the introduction to this Blueprint Update, there is an active effort to reduce paper waste by eliminating "free" printing in public computer labs. Housing has already implemented this, and the rest of the campus is considering following suit. The sentences in quotes are taken directly from the draft report of the Pay for Printing Taskforce of the campus Information Technology Council:

"The demand for student printing has continued to rise each year. There are many likely reasons for the increase in printing volume in the computer labs. The Library estimates that paper use increased by 28% and toner cartridge use increased by 35% in FY 2001. Housing experienced similar increases prior to adopting a pay-for-print system in February 2001." Last year, Housing eliminated free printing from computer labs in the residence halls, instead charging individual users. In the first year of implementation, Housing estimates a 55% reduction in paper use. However, some of this reduction may reflect residents switching and using free printing opportunities in other campus computer labs.

The Campus Information Technology Council is currently considering the issue of pay for printing in the public computer labs on campus. The IT council created a Pay-for-Printing Task Force "to determine appropriate printing solutions for the campus public and student-based printing. The goals of the ideal solution are to:

- Contain printing costs for the campus
- Provide fair and equitable access to print services for all campus constituents
- Reduce waste by providing a financial incentive to conserve resources"

Currently, ITS computer labs print approximately 15,000,000 pages per year, or 30,000 reams of paper. At a conservative estimate of 33% savings, a conversion to pay for printing could save 10,000 reams per year. If the reduction is as large as that within Housing, the reduction could be over 15,000 reams per year - all at a net financial savings to the university.

The Environmental Center has made a proposal to couple the implementation of paid printing with the use of 30% or 100% post-consumer recycled paper in the labs. This action would reinforce the environmental benefits of the switch and make it clear to the campus community that the pay-for-printing initiative is justified by environmental sustainability as well as cost recovery for the university.

Discussion Topics

- Should the Solid Waste Advisory Board, which effectively coordinated departmental involvement and communication with the Chancellor from 1990 until approximately 1998, be re-appointed?

- Since many of the improvements needed to reach the Blueprint goal for capping solid waste involve administrative support or assistance, how can this best be accomplished?
- Are there capital improvement needs that have not been adequately considered in CU Recycling prioritization process?
- With the eventual replacement of CU's recycling facility scheduled for the next 3-7 years, what are some of the design and processing elements that should be considered now?

Greening the Design and Construction of Campus Buildings

Green building is a multi-faceted issue which is partially addressed as part of some of the other goals of the Blueprint for a Green Campus. Due to recent progress and plans underway, it is worthwhile to address these efforts in a dedicated section.

Progress

The University Memorial Center (UMC) expansion and renovation project has served as a pilot project for green building on campus. The design and project teams prioritized sustainability as one of the tenets of the project. The building has expanded by over 50,000 square feet and the 136,000 square feet of existing space is currently being renovated. The expansion and renovation of the UMC has made exceptional progress in addressing indoor air quality, use of recycled and renewable materials, energy and resource conservation, and waste reduction and recovery. Other building projects on campus, the community and the region will be able to look to the examples set by the UMC. A fact sheet on the UMC project is attached as an appendix to this section.

In the last year, Housing has incorporated a small number of green building measures. As mentioned in the previous section, approximately 10 tons of construction materials from the Farrand dining renovation were reused or recycled. And recycled carpeting was used in the Family Housing office remodel. Additionally, the project review process as outlined in the Project Manager's Policies and Procedures Guidelines now includes an environmental review of each project by the Environmental Coordinator.

There has also been progress in the recovery of construction and demolition waste with the Hunter demolition, Grandview demolition, and the University Memorial Center expansion and renovation projects. Phase One of the UMC project recovered over 2.5 million pounds of materials. These included scrap metals for recycling, brick and concrete, and sandstone and clay roof tiles for reuse. See the attached spreadsheet report. Phase Two of the UMC project promises to be equally successful. Planning has identified a large quantity of recoverable materials in the renovation phase. However, markets do not exist for some of the larger volume materials such as carpet and wood doors.

Plans

Staff from the University of Colorado attended a Leadership in Energy and Environmental Design (LEED) workshop sponsored by the City of Boulder in December, 2001. The workshop addressed how the LEED Green Building Rating System could be further implemented in the Boulder community. CU staff are now considering what would be involved in adopting some version of the LEED system and incorporating it into CU building standards. To proceed further, the existing CU standards need to be compared with the LEED system to identify where

CU standards already satisfy the green building requirements and where they can be improved. Where feasible, changes to the building standards could be proposed as part of the annual revision process which takes place each June.

A meeting of the Facilities Management construction managers in February, , 2002 addressed the Waste Reduction and Recycling Appendix of the UCB Standards as well as the long-term potential to improve green building efforts on campus construction projects. The Appendix covers recycling provisions in building design, construction and demolition waste recovery, and the use of recycled products in building construction. The content in the five-year old listing is in need of updating and certain items need to be integrated directly into the UCB Standards in order to be recognized as required and better referenced by contractors and project managers. Changes to the Appendix will be proposed and reviewed by the Facilities Management construction managers in preparation for the annual standards revisions.

Discussion with the Facilities Management construction managers will continue to determine the best methods and timeframes for incorporating green building input on projects in the planning phase. Part of the success of the UMC project is based on prioritizing sustainable design from the inception of the project; thus, incorporating green building aspects into program planning, design and budget considerations.

An analysis of the construction and demolition waste recovery efforts at Hunter and the University Memorial Center needs to be conducted. Documentation of cost-savings and landfill diversion rates should be assessed to potentially set standards and direct future efforts.

Admittedly, there is some resistance to green building. This likely is due to project managers' unfamiliarity with the approach, methods, products, costs, and benefits of green building. In addition, the network of product suppliers, and design and construction professionals is still early in its development. To facilitate expanding green building within Housing, a training program will be developed for project managers and area supervisors, and implemented in the summer or fall. Training could also possibly be coordinated with Facilities Management.

Discussion Items

- Should the Blueprint for a Green Campus committee consider setting a goal specifically for this issue?
- Should CU adopt green building standards modeled after the LEED system of the US Green Building Council?
- How can the Boulder campus and the CU system secure additional funds for advance investment in green building initiatives, including energy conservation measures, for large renovations and new construction projects?

University Memorial Center

Green Building Components of the Expansion and Renovation

Project Background

The expansion and renovation of the UMC has served as pilot green-building project on the CU-Boulder campus. Hopefully other capital projects on campus will use it as an example.

The UMC project teams prioritized sustainability as one of the guiding principles of the project. By implementing certain processes and materials, the building is more of a livable, enjoyable, and sustainable space for students, workers, visitors and the environment.



Over 50,000 square feet were added onto the existing UMC

136,000 square feet will be renovated this spring and summer

Why Build Green?

The design, construction, and maintenance of buildings have a tremendous impact on our environment and our natural resources. The building sector alone consumes two-thirds of electricity produced in the U.S., and is a significant contributor to air pollution and the pollutants that cause climate change. The challenge then becomes to “build smart” so that buildings use a minimum of nonrenewable energy, produce minimal pollution, and use a minimum of dollars, while increasing the comfort, health, and safety of the people who work in them. Since building design has a strong impact on student learning, occupant health and occupant productivity, green building is important to incorporate at CU.

Recycled/Renewable Material—

By using recycled and/or renewable materials, we are cutting down on the strain on Earth’s shrinking base of finite raw resources. We have carefully selected materials that are durable, contain recycled content, to reduce negative environmental impacts and to support the growing market of growing quality recycled products.

- recycled content carpet
- linoleum (a natural-based, durable flooring)
- bamboo flooring (a rapidly renewable wood alternative)
- Environmental Center workstations made of 98%-recycled content
- Surrounding landscaping will use native flora

Energy and Resource Conservation—

We try to conserve energy by utilizing certain materials and appliances that require less energy to operate and by keeping the energy cycle in-house, thus producing less strain on the grid and ultimately less strain on our environment.

- motion-sensor lighting in offices and conference rooms
- daylighting (through strategic window placement, including the atrium)
- UV protective windows
- in-house chilled water supply
- lighter-colored roof tiles (reflects light and heat from the sun to reduce cooling costs)
- wind power (purchased through student fees)
- HVAC (heating, ventilation, and air conditioning) system does not emit CFCs into the atmosphere

Waste Reduction and Recovery—

We encourage the reduction of all waste and the recovery of materials that are reusable or recyclable in all phases of demolition, construction, and use of the building and surrounding areas.

- recycling stations have been built into high use areas
- construction and demolition recovery
 - Over 2.5 million pounds of construction and demolition waste were recovered for recycling or reuse (ie: flagstone, concrete, steel, cardboard, sandstone, etc.)

Indoor Air Quality—

We addressed the issue of the health of the building occupants by ensuring a suitable and livable indoor air quality by reducing the use of materials that are odorous and/or irritating to one's health or well being.

- low VOC Paint
- anti-static linoleum flooring (static electricity can dry out the air)
- low VOC adhesives
- operable windows