# UNIVERSITY OF DENVER SUSTAINABILITY PLAN & REPORT AY 2008-2009


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## INTRODUCTION

We believe that one mark of a leading university is its commitment to sustainability and the practice of building sustainability into many aspects of university life. Sustainability is an effective approach to meeting the University's ethical obligations to the global environment and to the rest of humankind. As significantly, practicing sustainability enriches our capacity to undertake our educational mission, teaching our students the skills and values they will need to thrive and to create a better world in the future.

Sustainability yields many benefits to institutions that successfully cultivate it. The institution gains an edge in educational and research opportunities and in preparing students for living and working in a diverse, global society in which sustainability will be an issue in many forms.

As the 1987 Report of the World Commission on Environment and Development (Brundtland Report) put it, "the environment is where we all live" and development "is what we all do to improve our lot within that abode." The Commission sought ways in which development could be put on a sustainable path. The Commission defined "sustainable" to mean "meeting the needs of the present without compromising the ability of future generations to meet their own needs." The Brudtland Report initiated, at the international level, the search for a path to sustainable development. The urgency of that search has been increased by our growing realization of the threat posed to civilization by continued emissions of greenhouse gases and the climate change they cause.

The University of Denver community is strongly committed to the pursuit of excellence by including and integrating environmental values, environmental issues and sustainable practices into every aspect of its endeavors.

In the past few years more than 600 American University Presidents and Chancellors have signed the "Presidents Climate Commitment." The preface to that commitment states:

> We, the undersigned presidents and chancellors of colleges and universities, are deeply concerned about the unprecedented scale and speed of global warming and its potential for large-scale, adverse health, social, economic and ecological effects. We recognize the scientific consensus that global warming is real and is largely being caused by humans. We further recognize the need to reduce the global emission of greenhouse gases by 80% by mid-century at the latest, in order to avert the worst impacts of global warming and to reestablish the more stable climatic conditions that have made human progress over the last 10,000 years possible.
>
> While we understand that there might be short-term challenges associated with this effort, we believe that there will be great short-, medium-, and

> long-term economic, health, social and environmental benefits, including achieving energy independence for the U.S. as quickly as possible.
>
> We believe colleges and universities must exercise leadership in their communities and throughout society by modeling ways to minimize global warming emissions, and by providing the knowledge and the educated graduates to achieve climate neutrality. Campuses that address the climate challenge by reducing global warming emissions and by integrating sustainability into their curriculum will better serve their students and meet their social mandate to help create a thriving, ethical and civil society. These colleges and universities will be providing students with the knowledge and skills needed to address the critical, systemic challenges faced by the world in this new century and enable them to benefit from the economic opportunities that will arise as a result of solutions they develop.
>
> We further believe that colleges and universities that exert leadership in addressing climate change will stabilize and reduce their long-term energy costs, attract excellent students and faculty, attract new sources of funding, and increase the support of alumni and local communities

By signing the Presidents' Climate Commitment, each University president or Chancellor agreed:

> 1. Initiate the development of a comprehensive plan to achieve climate neutrality as soon as possible.
>
> 2. Within two years of signing this document, develop an institutional action plan for becoming climate neutral, which will include:
>
> i. A target date for achieving climate neutrality as soon as possible.
>
> ii. Interim targets for goals and actions that will lead to climate neutrality.
>
> iii. Actions to make climate neutrality and sustainability a part of the curriculum and other educational experience for all students.
>
> iv. Actions to expand research or other efforts necessary to achieve climate neutrality.
>
> v. Mechanisms for tracking progress on goals and actions.

On June 5, 2007, Chancellor Robert Coombe of the University of Denver signed the Presidents' Climate Commitment. He stated "The DU community is concerned with global warming and vested in sustainability," Coombe says. "Universities should play an

important role in building sustainability through continued efforts to reduce greenhouse gas emissions.”

This document is both the “comprehensive plan to achieve climate neutrality” envisioned by the President’s Climate Commitment and a broader document to chart DU’s path toward incorporating sustainability into both its operations and its educational mission.

## METHODOLOGY

In order to meet the requirements set forth in the climate commitment, the University of Denver Sustainability Council set out to draft a sustainability report and plan reflecting the practices, goals, and ideology of the university's sustainability movement. To do so, the council, comprised of faculty, administrators, and students established six working committees to address the wide area of issues pertinent to sustainability and the institutional efforts at adaptation.

In response to the signing of the PCC, the University has formed the University Sustainability Council consisting of up to five faculty, five staff, five students, four functional area representative (Planning & Budget, Facilities, Architect's Office, and University Communications), as well as three ex-officio members (the Provost, Vice Chancellor for Business & Finance, and the Vice Provost for Graduate Studies & Research). The Sustainability Council recently amended it's by-laws to include representatives from the University of Denver Faculty Senate, University of Denver All University Student Association Senate, the Graduate Student Council, University Staff Advisory Council and Student Bar Association. The Sustainability Council's purpose encompasses environmental, social, and economic sustainability.

The Council has been meeting since February, 2008 and has formed six committees focused on investigating and addressing: Best Practices; Curriculum & Research, Facilities, Utilities, Design, & Construction; Outreach; Reduce/Reuse/Recycling; and Transportation. There are council members on each committee in addition to other members of the University community (more students, staff, and faculty).

The areas of evaluation for this sustainability plan and report draw heavily from the Association for the Advancement of Sustainability in Higher Education (AASHE) STARS (Sustainability Tracking, Assessment, and Rating System) instrument. Thus, each area of the DU report indicates in parentheses the applicable STARS credit(s).

Using the STARS credits as a guide, the University of Denver Sustainability Council committees were then responsible for a number of credits that associated most closely and logically with their committee charge. Members of the council and committees then collected data and reported on the data for the compilation and writing of this report. Data has been validated through member-checks, peer review, and community feedback.

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## CURRICULUM & RESEARCH

### Subcategory 1. Curriculum

**Sustainability in New Student Orientation (ER 3)**

***Rationale***

The University of Denver takes seriously the process of orienting new students to the campus and to their particular academic interests by providing comprehensive orientation programs. The intent is to provide students with the best understanding of the university expectations as well as resources available to help them be successful in their academic pursuits and the university community. Both undergraduate and graduate orientations are offered at the beginning of the academic year as well as throughout the matriculation process by specific departments. As the university adapts and works toward increasing measures of sustainability, new student orientation is recognized as a key location of change.

Topics covered during these orientations include but are not limited to the following: small group discussions, large group presentations, interaction with faculty, computer configuration, language placement tests, academic advising, parking/commuter information, eco-pass allocation, student life/club orientation and course registration.

With over 1,000 international students, scholars, researchers and their dependents at DU, orientation is considered essential for settling in and becoming successful in DU's academic community. International student/scholar orientation is therefore mandatory and in addition to any other required student/department orientations (http://www.du.edu/intl/isss/newstudent.htm).

***Strategies***

Undergraduate Orientation: For all incoming first year students a full week is devoted to acclimate students as well as their parents and families to the academic and social expectations of the university through the "Discoveries" program (See http://www.du.edu/studentlife/Discoveries/). In addition, within the Division of Student Life, the Department of Housing and Residential Education has developed a sustainability vision statement that will inform the student leadership training program and be a part of the living and learning experience for resident students. To facilitate this educational movement, a "student guide to sustainability on campus" is being developed by the office of housing and residential education and will be a part of orientation activities. The Housing and Residential Education sustainability vision statement states:

> "We, the students, staff, and community members of the Housing and Residential Education Department of the University of Denver, recognize the critical importance of sustainability. We commit to environmental, social, and economic sustainability by pledging to "meet the needs of the present generation without compromising the ability of future generations to meet their needs" (Brundtland, 1987). We, as agents of

> change, aim to reduce our environmental impact, including carbon consumption and greenhouse gas emissions through activism, empowerment, collaboration, and educational programming. In doing so, we view equality, diversity, and social justice as an essential component of sustainability and will work to engage all residents to actively participate in sustainable practices to be leaders in stewardship as global citizens serving the public good."

In addition, the robust, weeklong Discoveries program orients students to issues related to diversity, the University Honor Code, residential life expectations, campus life opportunities, academic program orientations, course registration, and subject/course placement testing. Transfer students participate in a shortened version of the orientation and are not assigned to a First Year Seminar. During this week of full day programming students are assigned to small groups of 15 which corresponds to their First Year Seminar taught by full time faculty during the first quarter. "First-Year Seminars are designed to provide students with an in-depth academic experience that will be rigorous and engaging. Students will develop the kinds of academic skills that will prepare them for successful college work, including writing, critical reading and thinking, discussion, argument and debate."
(http://www.du.edu/studentlife/Discoveries/firstyearstudents.html)

International Student Scholar Services: The Office of Internationalization requires all international student scholars of all levels to participate in orientation to the University of Denver as well as the legal obligations of studying in the United States. "For newly arrived international students there are orientation sessions at the beginning of each term. Students are required to check-in, that is provide copies of their immigration papers, and fill out several forms as well as attend an orientation session. Students will NOT be allowed to register until they have completed these requirements."
(http://www.du.edu/intl/isss/orient.htm)

Graduate School Orientation:
Each division or college hosts its own graduate school orientation with various configurations of information and timing
(http://www.du.edu/experience/life/resources/orientation.html).

Daniels College of Business Orientation:
http://www.daniels.du.edu/enet/student/orientation/conference.cfm?ID=16

Sturm College of Law Orientation: http://law.du.edu/index.php/student-affairs/orientation

**Sustainability Related Coursework and Academic Programs (ER 4,5,6,7,8)**

| | |
|---|---|
| Environmental science/studies major(s): | *BA (environmental science), BS (environmental science), BA (geography – environmental focus), BS (environmental chemistry)* |
| Environmental/science/studies minor or concentration: | *Environmental science minor; geography minor; ecology minor* |
| Graduate-level environmental program: | *MSM and MBA Concentration in Environmental Policy & Management within Daniels College of Business; MAS in Environmental Policy & Management within University College; LLM and MRLS in Environmental and Natural Resource Law within Sturm College of Law; MA in Geography (several environmental and sustainability themes); MS in Geographic Information Science (several environmental and sustainability themes); Ph.D. in Geography (several environmental and sustainability themes)* |

***Rationale***

A large number of sustainability focused and sustainability related courses are offered through almost all of the academic units at the University of Denver. The array of courses spans the range from undergraduate, introductory "foundations" courses and undergraduate advanced courses, to graduate-level coursework in the Sturm College of Law, the Daniels College of Business, and the Korbel School of International Studies. In addition, non-traditional programs such as the Interterm Service Leaning Program and the University College offer sustainability related courses. The breadth and array of courses offered at the University of Denver started to become apparent at the 2007 Annual Provost's Conference, which was on the topic of sustainability. Subsequently, in summer 2008, an informal survey of sustainability related courses at the University of Denver was conducted. The robust array of sustainability courses available to students across almost every academic unit at the University of Denver is strength of the institution that is not well documented, but an ongoing audit is underway.

***Strategies***

- The informal survey of courses represents a good start in understanding the collection of sustainability focused and related courses offered at the University of Denver. Verification of the timing and frequency of course offerings will become an on-going activity with annual updates and appropriate documentation that this information available to students, faculty and administrators.
- The dispersion of courses in academic departments as well as through the service learning and other programs, and the academic credit hours of sustainability-focused and sustainability-related courses is not well documented at the University of Denver. We propose to work with Deans and Department

Chairs to better develop these metrics. Such an audit of university academics will include social, environmental, and economic sustainability.

- A Sustainability minor is in preparation by Dr. Mathew Taylor (and others) in the Division of Natural Sciences and Mathematics. The intent of this minor is to build on a foundation of existing sustainability focused courses and to allow for specialization in coursework offered across all of the undergraduate course offerings that focus on sustainability. As yet there is no graduate program offered but we note with envy the graduate foci in sustainability at other institutions and would promote such a program at the University of Denver given appropriate resources.

**Undergraduate Academic Program and Graduation Requirement (ER 9, 10)**

***Rationale***

An undergraduate interdisciplinary minor is the first of several options in which to help meet the expectation of a particular sustainability-focused program. The University of Denver is in the final stages of implementing an Undergraduate Interdisciplinary Minor in Sustainability.

The curriculum plan for the Sustainability minor requires students to take 6 courses. A 'gateway' course will provide foundational aspects of sustainability, and a 'capstone' course will focus upon current issues in sustainability. Students are also required to take sustainability-focused courses in each of the breadth areas of environmental, economic, and social equity. See the accompanying draft of the Sustainability Minor proposal.

The university also believes that sustainability education is cross-disciplinary endeavor. Therefore, the sustainability minor will be interdisciplinary, drawing upon faculty, courses, resources, and students from all across the campus. Faculty members are encouraged to propose new courses that directly align with any of the three pillars of sustainability.

Aside from the minor program noted above, currently there are no known sustainability graduation requirements at either the University-wide curriculum level, or within departments. Along with many other strategies toward becoming a more sustainable institution, the University of Denver is considering a sustainability graduation requirement.

***Strategies***

- The University of Denver is implementing a brand new Undergraduate Interdisciplinary Minor in Sustainability. Functional administration of the degree program is housed within the Department of Geography.
    - The minor program is scheduled to begin with the Spring 2009 quarter. (Expected enrollment in the Sustainability minor: 25 students during the first 2 years; as many as 100 after 4 years, depending upon demand.)

## Sustainability-Focused Graduate Academic Program (ER 11)

***Rationale***

The University of Denver recognizes that the mission of a university is to prepare students today for a future characterized by change, uncertainty, wide disparities in quality of life and hope, and yet, tremendous opportunity. As such, the University is committed to refining existing curriculum and creating new curriculum consistent with the ideals of sustainability. Research shows that today, maybe more than ever before, students want to be able to make a living and make a difference in the world. For DU, this means a close interaction between faculty and students, "a partnership that lies at the heart of teaching and learning" (Coombe, Summer 2008) that encompasses both relevant experiential opportunity with rigor in the classroom and collaboration in research. Particular emphasis is placed on development of skills and abilities to interpret data, information, and experiences. The goal is to graduate "capable, well-informed men and women whose lives can influence the future and by using our intellectual assets to develop new ideas that can have a direct impact" (Coombe, *University of Denver Magazine*, Summer 2008).

***Strategies***

- A variety of units within the University have created a number of special entities that relate to various aspects of sustainability. Examples include the Environmental Law Clinic, International Human Rights Advocacy Center, Conflict Resolution Center, Rocky Mountain Land Use Institute, Intermodal Transportation Center, and the Daniels Ethics Network.
- A number of other units have created degree programs, not devoted solely to sustainability but which have a significant percentage of the degree program content sustainability oriented. An example is the Daniels College of Business's MBA program in which twenty percent of the degree is focused on sustainability related issues or specifically with the concept, including a required course in Building Sustainable Enterprises.
- The university is committed to providing as many students as possible with an international experience. Many graduates who engage in some international experience are involved with projects around sustainability.

## Study Abroad Program (ER 12)

***Rationale***

A key goal of the University of Denver (DU) is to develop global perspectives and connections by substantially expanding student and faculty experience abroad. DU's was recently ranked highest, among all U.S. doctoral institutions, in percentage of undergraduate students (74.4%) who study abroad ( www.opendoors.iienetwork.org/ ). Students have three primary avenues through which to participate in study abroad opportunities: the Cherrington Global Scholars Program, the International Service

Learning program, and faculty-led regular term and interterm study abroad courses. Many of the available study abroad programs are sustainability focused or related, as outlined below.

***Strategies***

- The Cherrington Global Scholars Program (http://www.du.edu/intl/abroad/) program gives eligible juniors and seniors the opportunity to spend one academic quarter studying abroad at no additional cost beyond their normal tuition. Cherrington offers more than 150 study-abroad programs in 56 nations. Those programs identified as having a specific sustainability focus include, [with student enrollment numbers for 2007-8]:
    - School for International Training (Kenya, Jordan, Brazil, Ecuador, Senegal) [16]
    - School for Field Studies (Costa Rica, Kenya) [2]
    - International Sustainable Development Studies Institute, Thailand [1]
    - Sea Semester [3]
- The International Service Learning program (http://www.du.edu/intl/isl/) combines academic learning with volunteer opportunities abroad. Programs are led by DU faculty and place particular emphasis on topics of sustainability including: globalization, social justice, rural health, community-based tourism and sustainable community development. By working with refugees, providing health education, or tutoring children or adults, students connect their classroom knowledge with real life, while working alongside people in developing/disadvantaged countries to meet community identified needs. This opportunity follows DU's mission to develop global perspectives and connections and to make significant contributions to the public good.
    - Current 2008 service learning destinations include [with student enrollment numbers]: Bosnia-Herzegovina [14], Dharamsala (India) [12], Ecuador [6], El Salvador [9], South Africa [11], and Thailand [6].
- Across campus several faculty-led study abroad courses are sustainability-related. For example:
    - Annually, the Geography field quarter addresses human-environmental issues with approximately 12 students at sites in the U.S., Mexico, and Nicaragua.

**Lifelong Learning (ER 13, 14)**

***Rationale***

The University of Denver recognizes its role as a member of the larger community; indeed, the University promotes itself as "a private University for the Public Good". Offering non-credit and non-academic courses is thus central to DU's position in the community. Many such programs exist within the University, and virtually every College on campus invites the community to participate in education in some fashion. The DU website proclaims the University's practice of seeking "opportunities to work with people to help them arrive at positive outcomes for their employees, citizens or beneficiaries", and offers a comprehensive list of opportunities to promote lifelong learning for non-

matriculating members of the community. Chancellor Coombe has stated that "learning is a lifelong process, and lifelong learning is a DU tradition." Sustainability as a theme is especially well suited for community outreach, and several of DU's non-academic programs are organized around sustainability.

***Strategies***

- The Osher Lifelong Learning Institute is "designed for men and women age 55 and "better" who wish to pursue lifelong learning in the company of like-minded peers". Promoted through University College's Enrichment Program, course offerings change each year and remain timely. The 2008-2009 catalogue includes these courses: Colorado's Mountain Pine Beetle Battle, Fish in Peril, Cloud and the Mustangs of Arrowhead Mountain (all part of the Species on the Brink mini-series), The End of Cheap Oil, South Africa: From Apartheid to Multicultural Diversity, City of the Future: Transitional Strategies in Planning the City of Tomorrow, and The World of Hinduism. Osher is committed to offering sustainability-related lifelong learning courses.
- Salons are organized by a number of academic divisions around campus. For example, the divisions of Arts, Humanities, and Social Sciences (AHSS) offers an annual spring salon series; this year, several topics related to sustainability will be offered including "The Politics of Climate Change."
- Alumni symposium brings several hundred returning alumni to campus each fall for structured discussions led by DU faculty. Themes for presentations change each year, but often include sustainability material.
- The University of Denver's Senior Citizen Audit Program allows adults age 60 or older to audit select Undergraduate courses. Availability is based on class size and permission from the instructor. The cost to audit is $25 (twenty-five dollars) per course. This program creates access to DU's many sustainability-focused courses for older members of the community.

**<u>Faculty and Staff Development and Training</u> (ER 17)**

***Rationale***

One of the missions of the University of Denver is to promote "active partnerships with local and global communities [that will] contribute to a sustainable common good" (University Planning Advisory Council, *Vision, Values, Mission, & Goals*, 2001). This mission is integral to the pursuit of local and global sustainability and crosses all disciplines on campus. The University of Denver sustainability plan and education campaigns aim to encourage thoughtfulness in each member of the community and the impact of their individual choices on the world around them. It does this through promoting the development of formal and informal education programs that involve service learning, both on campus and in the larger Denver community.

***Strategies***

- The University supports a Center for Community Engagement and Service Learning (CCESL) with five full-time staff members. Two goals of the center

include: (1) supporting faculty in community-based learning and public good efforts at the university and (2) developing students into engaged citizens who actively participate in the public life of their communities. The CCESL provides a number of incentives for faculty to develop courses that include a service-learning component (detailed below).

- *Service-Learning Scholars Program:* Provides a stipend for faculty to develop a set of best practices for implementing service-learning projects. Each participating faculty member is expected to develop a new course syllabus which includes a service-learning component. To date, forty-one classes that include service learning have been developed across all major divisions on campus. Most of these courses have themes related to social sustainability (e.g., Foundations in Philosophy—Social Justice, Introduction to American Politics, Leading Community Change), and a number have themes related to environmental sustainability (e.g., Wild Colorado, Environmental Chemistry, Political Ecology of Natural Resources in Guatemala).
- *Service-Learning Pods:* Financial and administrative support is provided to small groups of faculty members working together on community-based issues. A pod focused on campus environmental sustainability was created in Fall 2008, and the participating faculty cross a range of disciplines, including geography, environmental science, political science, business, chemistry, and biology. An anticipated outcome is the development of new or revised courses across several disciplines that focus on campus sustainability issues related to food production and consumption.
- *Mini-grants:* Service-learning mini-grants are available to faculty for purchasing books, journals and print material related to community-based learning; hosting workshops, recognitions, community partner dialogues; purchasing equipment needed for service-learning courses and projects; creating assessment models and evaluation practices of community-based learning courses; or finding student assistance with service-learning classes.
- *Public Good Fund*: Since 2004, the Provost, with support from the University Planning Advisory Council (UPAC), has provided an annual fund of $100,000 to promote and increase public good activities at the University of Denver. Many funded projects aim to promote formal and informal student learning through public good projects.

## Sustainability in New Employee Orientation (ER 18)

***Rationale***

Over time the DU Community will need to maintain and enhance the culture of sustainability we will create. An essential component in that effort will be the development and inclusion of sustainability in new employee orientation materials and meetings.

***Strategies***
The University of Denver already has a well established new employee orientation structure including on-line orientation, and on-line orientation exam, and regularly scheduled orientation sessions. http://www.du.edu/hr/new_ee/orientation.html The program already includes aspects of DU's history and culture. It is currently being proposed that this structure be expanded to include the essential elements sustainability program including, but not limited to:

1. The Chancellor's sustainability statement http://www.du.edu/c-vids/chan-sustain.html
2. The Chancellor's commitment to make DU a carbon neutral institution and a link to the Presidents' Climate Commitment . http://www.presidentsclimatecommitment.org/
3. The resources on the DU Sustainability Website http://www.du.edu/green/
4. The DU Sustainability Office (once one has been established).
5. Basic information about the DU Recycling Program http://www.du.edu/recycling/

**Employee Peer-to-Peer Sustainability (ER 19)**

***Rationale***
Over time the DU Community will need to maintain and enhance the culture of sustainability we will create. An essential component in that effort is including sustainability in University employee culture.

***Strategies***
The purpose of the University of Denver Staff Advisory Council is:

- to be aware of the concerns of the staff (defined as appointed personnel other than faculty and union employees) (hereinafter "Staff") relating to the management and administration of the University and to make recommendations to the University administration on matters of concern to the Staff,
- to provide a means for the exchange and dissemination of information among and for University of Denver staff relative to problems, procedures and policies,
- to promote unity, cooperation, loyalty among all staff of the University of Denver,
- to work with any and all similar councils, groups, or bodies of the University to fulfill the aforementioned purposes.

Through the University of Denver Staff Advisory Council http://www.du.edu/staff/about.html and its representative on the Sustainability Council the University will provide resources for a quarterly "A Little Green" Program. At the discretion of the SAC "A Little Green" programs may include lectures, documentary films and discussion, books and discussion, blocks of staff tickets to

student and/or faculty oriented green events, invited speakers or outdoor events among other things.

At the discretion of the SAC member of the sustainability council “A Little Green” programs may emphasize the social justice aspects of sustainability as well as its environmental aspects.

## CURRICULUM & RESEARCH

### Subcategory II. Research

**Research Related to Sustainability (ER 20, 22, 24, 25, 26)**

***Rationale***

As a research institution, the University of Denver is committed to conducting research that furthers discovery of knowledge for the public good, including the advancement of sustainability. Research related to sustainability includes research that focuses on a key principle of sustainability, addresses a sustainability challenge, or addresses the social, economic, and environmental components of sustainability. The university has initiated efforts to track and inventory all of its research related to sustainability as of Winter, 2008 and the process is ongoing.

For purposes of this report, a cross-section of that research has been included to show the wide array of scholarship being conducted that relates to social, economic, and environmental sustainability.

***Strategies***

**University of Denver Fleet Vehicle Conversion to CNG, Allan Wilson**

Since June 2007, 7 of 15 vehicles from a variety of departments on campus have been converted to natural gas. It is estimated that the University has reduced CO2 emissions from the vehicles converted to date by 15.1 tons. Additionally fuel cost savings are estimated at 69% by utilizing natural gas versus unleaded gas. The project is scheduled to be complete June 30, 2008. Items to complete include installation of a natural gas refueling station on campus and converting the remaining eight vehicles. Sponsor: StEPP Foundation.

**Sustainable Community Development Code Reform Project, James van Hemert**

This initiative seeks to bring sustainability to the forefront as a land use issue and understand how local governments can support sustainable communities through innovative land use codes.

Initiative Objectives:

- Identify key sustainability issues and find ways to address them in the land use regulatory process through new standards, incentives, and the elimination of barriers.
- Analyze how current approaches to zoning, such as performance and form-based systems, must evolve in order to promote sustainable communities.
- Explore the nexus between sustainable land use planning and regulation, drawing upon examples from progressive communities that have adopted sustainable land use provisions.
- Develop and Implement a sustainable zoning code framework.
- Educate end-users, including local officials, developers, citizens, and professionals in order to foster awareness of how communities move towards sustainability.

• Act as a catalyst to bring various disciplines together –- from agriculture, health, design, planning, etc. - to form a coalition to support and promote sustainable development codes.

**Regional Institute for Health and Environmental Leadership, Kathy Kennedy**
There is currently a great need for a new kind of leadership for health and the environment because the challenges have never been greater, and because old paradigms of leadership are no longer effective in our very complex social, political and economic milieu. The Regional Institute for Health and Environmental Leadership provides leadership training, builds linkages among leaders, and strengthens the relationships among health professionals, environment professionals, the academic community, the public sector and the private sector. The mission of the Regional Institute for Health and Environmental Leadership is to develop, connect and leverage leaders who work collaboratively in diverse sectors and communities to create and sustain the health and well being of people and the environment. The goals of the Institute are: (1) to increase health and environmental leadership training opportunities in the Rocky Mountain Region; (2) to increase and improve relationships among RIHEL constituents, building upon and fostering a diverse and multi-disciplinary RIHEL network; (3) to improve health and environment in diverse communities by leveraging the leadership resources of the Institute; and (4) to provide the people and financial resources to assure the continuation of the Institute and its Mission. The Advanced Leadership Training Program is the flagship program of the Institute. The Advanced Leadership Training Program seeks a diverse group of middle - to senior - level professional men and women who are technically competent in their fields. When they have enough experience and future-orientation to have their own visions, they are ready for leadership development. This program is designed to help current and emerging leaders to understand their leadership behaviors, make use of the collaborative process to address complex problems, become proficient at coaching protégés and colleagues, and create a network of colleagues whose expertise they can draw upon in the decades to come. The Advanced Leadership Training Program involves four three-day events held at various sites around Colorado, New Mexico and Wyoming. The Institute website, http://www.rihel.org, is used for communication and instruction throughout the year. The Institute also provides, the leadership development curriculum for the LEADS program at the University of  Colorado School of Medicine. There, the Institute offers leadership development opportunities to medical students in the summer and medicine residents in the autumn. RIHEL has offered a variety of one and two day workshops on topics as broad as Crucial Conversations, Get PHIT!, coaching, negotiation, and ethical decision-making, and is poised to offer fundamental skills such as meeting facilitation, making effective presentations, project management, time management, stress management, professionalism and other leadership and management topics. A workshop on political advocacy is under development. Finally, the Institute has joined with the DU School of Law Rocky Mountain Land Use Institute to offer PLACE training (i.e., Planning Active Community Environments) for land use planners and public health professionals. Research Collaborators: CDC; EPA Region 8, DHHS Region 8, CDPHE; Wyoming DOH, Wyoming DEQ, New Mexico DOH; National Public Health Leadership Development Network.

**Hydrologic Impacts of Mountain Pine Beetle, Fraser Experimental Forest, Colorado, Michael Daniels**
Ongoing research in Fraser Experimental Forest, Colorado attempts to document the hydrologic and sedimentologic impacts of pine beetle infestation on steep, subalpine streams. Detailed channel surveys, measurements of large woody debris and calculation of hydraulic geometry relationships provide baseline data against which to compare changing discharge and bed sediment loads over the coming years; to decades as forest mortality intensifies and surface hydrologic conditions change. Research Collaborators: Sandra Ryan, USFS

**Regional Development Impacts of Trade Corridors: Recent Experiences from the United States, Andrew Goetz**
This paper examines the general topic of the regional economic and environmental impacts of transportation corridors on nearby communities, with a specific focus on projects and plans in Colorado and the western US. Numerous theoretical and empirical studies have established the significant impact of transportation in facilitating economic development. Many small, rural, and/or economically distressed places have especially come to view transportation projects as vital to increasing regional employment and long-term economic growth. Similarly, many studies have addressed the environmental and social implications of transport projects, usually in the context of more highly urbanized communities. Several of the trade corridor plans and projects in the US have emphasized their economic development benefits at different geographic scales while being cognizant of minimizing negative environmental and social externalities upon local communities. Research Collaborator: Sutapa Bandyopadhyay. Sponsor: Canada's Asia-Pacific Gateways and Corridors Program.

**Restoration of Ecosystems Invaded by Non-Native Plants, Anna Sher**
The primary concentration of Dr. Sher's research is the ecology of restoration of riparian (river bank) habitats degraded by invasive plants, those species that spread beyond their native range and damage ecosystems. With funding from the Center for Invasive Plant Management, her lab has conducted the first multi-state surveys of re-vegetated restoration sites, using multivariate statistical tools to identify environmental variables (such as soil salinity, precipitation level, temperature, etc.) associated with restoration success. This partnership with the Colorado Department of Agriculture and Colorado State University, conducted large-scale field tests to understand how to control invasive species influences in plant communities. These projects have primarily considered restoration associated with Tamarix spp. (tamarisk, saltcedar), a woody, Eurasian tree that invades watersheds, profoundly affecting biological communities and ecosystem processes (i.e., fire, flooding, and soil chemistry fluxes). Dr. Sher is one of just a handful of experts on the ecology of Tamarix, most known for work on competition with native trees. Tamarix is arguably the most economically and environmentally problematic invasive species in the western U.S., as evidenced by passage of the federal Saltcedar and Russian Olive Control Demonstration Act last year. National attention has increased efforts in riparian restoration, and Dr. Sher's lab is at the forefront of providing scientific guidance for these activities, producing the first two Best Management

Practices manuals on Tamarix control and restoration after removal. The Sher Lab is also testing the effect of this species on soil chemistry with funding from the BOR. As the Tamarix threat is mitigated, Russian olive (Elaeagnus angustifolia), is widely considered to be the next major watershed invader; and Dr. Sher's is one of the only a few labs in the country to study its ecology. Dr. Sher is also now including animal studies, such as an investigation of the trophic cascades caused by the recent introduction of a biological control for Tamarix. Together, this research will facilitate the repair of the riparian ecosystems in the West. Sponsors: Center for Invasive Plant Management, U.S. Environmental Protection Agency, U.S. Department of Interior Bureau of Reclamation

**Effects of Additives on Fossil Fuel Combustion, Dwight Smith**
This research involves the spectroscopic examination of fossil fuel combustion products. How they are affected by combustion conditions, and the composition of additives designed to diminish pollutants and increase fuel efficiency, are the major questions to be answered.
Research Collaborators: Abdul R. Chughtai, Senior Research Scientist. Sponsor: EnviroFuels LLC

**Remote Sensing Motor Vehicle Emissions Collection Program, Donald Stedman**
This research involves the continued development of on-road remote sensing of automobile emissions. The technique involves basically high speed (50 samples in a half second) spectroscopy in the infra-red and ultra-violet regions of the spectrum. For the last few years, the on-road capability has been emissions measurement of carbon monoxide, hydrocarbons and nitric oxide all in ratio to carbon dioxide, with the capability of monitoring emissions from almost any moving, mobile source of emissions. Automobile emission measurements can be made successfully at speeds between 2 and 152 mph. Smoke, speed, and acceleration are also measured. Most recently, the capability of monitoring simultaneously several more exhaust pollutants namely ammonia, sulfur dioxide and nitrogen dioxide has been added. Results over the years have demonstrated the success of new vehicle emission standards. The average fleet emissions have decreased by almost a factor of two over the last decade while the importance of the few gross emitters to the remaining pollution has increased. Half of the emissions now come from less than 5% of the vehicles. These vehicles are easily identified by means of on-road remote sensing; however, in the USA, the political will to deal with the identified gross emitters is lacking. Conventional, scheduled emission testing programs, while lucrative for the states and the operators, do not appear to be successfully lowering on-road emissions. Research Collaborators: Dr. Gary A. Bishop. Sponsors: Colorado Department of Transportation - The Smart Sign, Environmental Systems Products , The Coordinating Research Council, National Science Foundation, U.S. Environmental Protection Agency - Office of Mobile Sources

**Evaluation of the Colorado African Organization (CAO) Capacity Building and Community Development, Nicholas Cutforth**
This study is helping the Colorado African Organization (CAO) to increase its capacity in order to better serve its constituents. As an umbrella organization, the CAO's mission is

to consolidate local refugee organizations efforts and in order to enhance the delivery of services to African refugees and the capacity of refugees and the broader Colorado African community to advocate for their needs; and to increase its organizational capacity and improve cohesion within the community. As a result of increased capacity and cohesion, the CAO has identified three target areas in which it will design and deliver programs: youth, women's empowerment, and peer support groups for victims of war trauma. The study will consist of participant observations during regularly scheduled meetings and trainings of the CAO, and qualitative, semi-structured interviews with CAO and non-CAO members. Interview questions will revolve around how participants feel they are benefiting from the CAO training and meetings, whether they feel the CAO enhances the voice of their community members, and the extent to which participation in the CAO expands their notion of "community." Sponsor: Colorado Department of Human Services, the Office of Refugee Resettlement

**Commercial Building Energy Usage Optimization through Advanced Control of Distributed Generation, Rahmat A. Shoureshi**
Distributed energy resources hold great potential for meeting future energy needs. This research has been focused on Combined Heat and Power (CHP) applications in commercial buildings and efforts to optimize their operation through applications of Artificial Intelligence and advanced control systems. The long-term goal is to design ways to extend distributed generation into the physical design and controls of a building itself. The team is evaluating grid-connected and aggregated CHP systems with dynamic optimization and control to identify performance, system integration, regulatory, and interconnection issues. Building performance using CHP and desiccant storage are modeled using neuro-fuzzy inference system. Two commercial buildings are being used to identify and analyze the technical issues associated with the deployment and operation of the CHP. Sponsors: U.S. Department of Energy, NiSource

**The International Futures (IFs) System and Project, Barry Hughes**
International Futures (IFs) is a large-scale, long-term, integrated global modeling system. It represents demographic, economic, energy, agricultural, socio-political, and environmental subsystems for 182 countries interacting in the global system. The central purpose of IFs is to facilitate exploration of global futures through alternative scenarios. The model is integrated with a large database containing values for its foundational data series since 1960. The demographic module uses a standard cohort-component representation. The 6-sector economic module structure is general equilibrium. The socio-political module represents life conditions, traces basic value/cultural information, and portrays various elements of formal and informal socio-political structures and processes. IFs is used increasingly widely. It was a core component of a project exploring the New Economy sponsored by the European Commission. Forecasts from IFs supported Project 2020 of the National Intelligence Council and will also support the NIC’s Project 2025 for the US administration taking office in 2009. IFs was used to provide driver forecasts for the fourth Global Environment Outlook of the United Nations Environment Program. In 2007, the Frederick S. Pardee Center for International Futures was established at the University of Denver with a generous gift from Mr. Pardee. The Center will be housed in a pavilion

adjacent to Ben Cherrington Hall. Its core project in coming years will be a series of volumes called Patterns of Potential Human Progress. The study of the prospects for global poverty reduction is in manuscript form and will be followed by volumes on education and health. IFs is available to users both on-line at www.ifs.du.edu and in a downloadable form. Research Collaborators: Mohammod Irfan, Jose Solorzano, Cecilia Peterson, Janet Dickson, Jonathan Moyer, Anwar Hossain, Marc Sydnor, Kazi Irman Ahmed, Sheila Flynn, Jonathan Chesebro, Haider Khan, Krishna Kumar, Evan Hillebrand, Julius Gatune. Sponsors: Frederick S. Pardee, United Nations Environment Programme.

**Empowering Disadvantaged and High-Risk Youth: A Community-University Partnership in Public Housing Communities, Jeff Jenson**

A risk and resilience framework for understanding and preventing adolescent problem behaviors is being used to implement a university-community partnership aimed at providing academic enrichment, personal development and wellness, cultural enrichment, and career development activities and interventions to 60 high-risk minority youth and parents residing in three public housing communities in Denver. Interventions for targeted high-risk youth and families are delivered through a collaboration led by the University of Denver's Graduate School of Social Work, Center for Civic Engagement and Service Learning, and the Bridge Project, an after school program for high-risk youth and families in three Denver public housing communities. Longitudinal data collection assessing the effects of Youth Center interventions on academic performance and other behavioral outcomes began in 2006. Research Collaborators: The Bridge Project (University of Denver). Sponsor: U.S. Department of Health and Human Services, Office of Minority Health.

**Moral Identity, Moral Vision and Moral Action: The Strategies Civic Leaders use to Accomplish the Common Good within Communities who Hold Conflicting Values and Beliefs, Susan Manning**

This qualitative study examines the influence of moral identity and moral vision as they inform civic and community leadership. Specifically, civic leaders are confronted with conflicting values and beliefs on the part of constituents that present challenges toward accomplishing a common good. In addition, contextual factors impact the nature of a civic leader's influence, geography, cultural factors, institutional and social influences shape the variation and effectiveness of leaders' approaches. Qualitative interviews with civic leaders in urban and rural areas of Colorado are being conducted and analyzed. The sample includes civic leaders from many walks of life. Maximum variation sampling, which provides an array of civic leadership roles, cultural/ethnic identities, and geographical locations of leadership, has been employed. The results of the study will be used to develop a model of civic leadership strategies that can inform civic leaders in the process of enhancing the public good in society. The qualitative data can also be used to develop a survey instrument to collect data from a larger sample. Sponsor: University of Denver Center for Civic Ethics.

## Department Involvement & Interdisciplinary Research (ER 23, 26)

### *Rationale*

The University of Denver recognizes the importance of research throughout all disciplines that will be required for achieving a sustainable world. As such, the university is committed to, and recognizes the value of, both focused disciplinary research and interdisciplinary research consistent with the nature of sustainable development as a construct based upon the interdependencies of natural, social, and economic systems. The scope the university's sustainability research lens is captured by a statement from Chancellor Coombe: "We should be using our intellectual assets to develop and test new technologies that can better protect the environment and mitigate its degradation. We should be studying sociological and cultural responses to environmental change in order to recommend appropriate individual and collective behaviors. We should be working on new business models that can allow our economy to thrive as we respond in some positive way to climate change and the requirements of sustainability." (*University of Denver Magazine*, Summer 2008). Disciplinary and interdisciplinary research efforts touching some aspect of sustainability are found across the spectrum of the university.

### *Strategies*

- In 2006, the faculty members of the Division of Natural Sciences and Mathematics designated a primary emphasis for the future of division research scholarship in the field of environmental science; in 2008, this emphasis was modified to include sustainability.
- In 2007, the theme for the University wide Provost Conference was Sustainability. Subsequently, the university signed the President's Climate Change Commitment and created a university wide Sustainability Council. Within the council is a research and curriculum subcommittee to promote research.
- In the summer of 2008, core faculty worked to bring together research components across campus to address the future needs of the Denver metropolitan region as it plans for a sustainable future. The interdisciplinary initiative, Denver 2058, will include close collaboration with city and community leaders.
- In 2009, the Sturm College of Law will host the 18th Annual Land Use Conference on campus. "Sustainability: Beyond the Platitudes" will provide a framework and guidance for significant research in the areas of land use laws, transportation infrastructure, housing, and climate change impacts.
- In 2009, the Daniels College of Business will host a university wide conference, Sustainability at the Crossroads: Aligning Business, Society, and the Environment, with John F. Kennedy, Jr. giving the keynote address.

## OUTREACH & ENGAGEMENT

### Student Sustainability Outreach Program (ER 1)

***Rationale***

The University of Denver signed the American College and University Presidents Climate Commitment in Fall 2007 as a result of a student push to do so. Students have been behind the majority of the sustainable initiatives that happen at DU, including students' votes to secure a wind energy contract, and their project to upgrade to single-stream recycling across campus.

As such, the 2008-2009 All-Undergraduate Student Association (AUSA) voted to establish the AUSA Sustainability Committee. This committee serves as a conduit for sustainable student action. In recognizing the importance of students to DU's Sustainable efforts, the committee organizes and funds undergraduate student initiatives (see Appendix E).

The committee, supervised by AUSA Advisor Carl Johnson (cdjohnso@du.edu), is the largest-funded senate committee in the AUSA. It received $100,000 for the 2008-2009 school year; $43,000 has been dedicated to the campus wind-energy contract, while the remaining $57,000 will fund student initiatives and contribute to outreach campaigns. The funding is allocated from the student-activity fee, but a fall 2008 Senate vote increased next year's budget of the council by $10,000 during the creation of a Sustainability Fee for students.

The goal of the committee is to create a "green culture" on campus that is accessible and convenient for students and the greater campus community.

***Strategies***

Current committee projects include establishing a campus bike-sharing system in cooperation with the city of Denver, installing infrastructure for campus composting, and beginning a community garden for the purposes of education and the production of local food. We will also be establishing a system for the wider-use of reusable cups across campus.

To drive these initiatives, the committee is focused on a three-prong outreach approach:

- Campus Education: each quarter, the committee hosts a "Sustainability Forum," which welcomes the campus community into a discussion on Sustainability. The committee presents on the progress of their initiatives while also welcoming ideas, suggestions, comments, and criticism from the campus audience. The idea to promote the use of reusable cups around campus, through a cup-sharing program, actually came out of the first forum in October 2008.
- Campus and Community Partnerships: the committee is a partner of the University Sustainability Council, the Transportation and Parking Services Office, as well as multiple environmental organizations on campus (the Environmental Sustainability Living and Learning Community, the DU Environmental Team). We

have also reached out to the Health and Counseling Center and DU Athletics to supplement bike sharing and the reusable cup program. We will also be partnering with the Health Center on an education initiative regarding Tobacco and the environment in the winter. We are also partners with the City of Denver in organizing bike sharing; this partnership includes connections to Denver's GreenPrint initiative and the Mayor's office. Such partnerships, across the board, are integral in making our initiatives successful.

- Campus advertising: The senate website, www.du.edu/orgs/senate (click "sustainability") as a means of communicating with the campus, in addition to electronic flyers on campus video screens about our upcoming events. We have also been featured in the student newspaper. Such promotion has brough people to our events and meetings, and has been a great way to foster our partnerships with the campus community.

**DU Recyclemania: Sustainability Related Competition (ER 2)**

***Rationale***

The University of Denver has made dramatic advancement on sustainable issues, but will only be successful with full engagement by members of the campus community. One way to engage the campus is through competition. As such, DU has decided to enter the nation-wide RecycleMania competition (www.recyclemaniacs.org).

From January to March 2009, DU competed on aspects of per-capita recycling and waste minimization with hundreds of colleges and universities across the competition. The entire campus, including students, staff, faculty, residents, and commuters alike entered in the competition.

The competition will continue the momentum of the recycling program on campus, while increasing education and awareness about the issue, and making it a fun experience for the community.

***Strategies***

The planning and coordination for this incorporates the community throughout the 2008-2009 school year. In Fall 2008, the AUSA Sustainability Committee did the preliminary planning for the competition, which included registration, logistical communication with facilities staff, and designing a plan for promotion for the plan.

The Committee and the Facilities Department partnered in the Winter and Spring Quarter to track and measure campus recycling and trash data for the duration of the competition.

To promote the event, the Committee adapted the image of Oscar the Grouch; instead of being in a trash can, Oscar is in a recycling bin. The official RecycleMania logo was also used on all promotional materials, which included t-shirts, "Recycle Me" stickers to put on campus recyclables (in partnership with campus catering, Sodexho), as well as magnets for metal trash cans. Students are being engaged via the social networking

site, Facebook, as well as through a competition to produce the best 30-second video advertisement airing during the second half of the competition.

Volunteers also visited classrooms across campus to briefly present about the competition and teach others what is recyclable on campus and the importance of reducing waste (trash and recycling) across the board.

To aid with this competition, the AUSA Senate dedicated a resolution to reduce printing output and promote the use of electronic documents across campus (see Appendix F).

The competition wrapped up in the Spring with a capstone program, open to the community, meant to celebrate recycling and the campus commitment. Official results for the competition will not be released until October 2009, but the increased amount of recycling and minimization of waste on campus is definitely something to celebrate.

## Community Service & Service Learning (AF 14 & 15)

***Rationale***

The University of Denver's vision is to be a "great private university dedicated to the public good," and its mission states that "[O]ur active partnerships with local and global communities contribute to a sustainable common good" (http://www.du.edu/chancellor/vision/index.html).

One of the ways the University is achieving these goals is through its Center for Community Engagement and Service-learning (CCESL) (http://www.du.edu/engage/index.htm).

Although DU does not specifically have a "community service center," the CCESL office is dedicated to building DU's capacity for service-learning, which it defines as "active learning that links traditional academics with community service" (CCESL Strategic Plan for sharing, p. 3). (CCESL also focuses on "engaged scholarship," which the office advances through its Public Good Fund. This fund supports faculty and staff who are "conducting innovative community-based research" (CCESL Strategic Plan for sharing, p. 10).)

Sturm College of Law Public Service Requirement

The Sturm College of Law, in an effort "to remain in the forefront of public service," requires all Juris Doctor students to perform a minimum of 50 hours of supervised, uncompensated, law-related public service work prior to graduation (www.law.du.edu/index.php/public-interest-office/public-service-requirement).

Daniels College of Business

Undergraduates at the Daniels College of Business are required to take Business 1080, a leadership course that requires students to do 8-10 hours of service-learning (csherrod@du.edu).

All graduate-level students participate in the Compass Program, which is one component of the Community Capital Project. This program involves some service-learning. Cody Sherrod, Manager of Service Learning and Community Relations (csherrod@du.edu), estimates that about 80% of these projects are nonprofit-related (working on strategic business issues for the nonprofits) and that participating students spend 10-15 hours on their projects. There are approximately 400 graduate business students.

***Strategies***

CCESL's stated mission is "to educate, engage, and equip the campus community to accomplish tangible, public work that improves the lives of people in our communities" (CCESL Strategic Plan for sharing, p. 2). The office strives to "deepen [its] current work by creating powerful connections between… curricular and co-curricular offerings," and its strategic plan divides its priorities for the next five years into the following categories: Public Good, Service-learning, Community Engagement, and Operational Excellence (CCESL Strategic Plan for sharing, p. 4).

CCESL is "recognized as one of the top service-learning centers in the nation (CCESL Strategic Plan for sharing, p. 3), and its FY08 staff is made up of 4.25 FTEs (the organizational chart is available on page 24 of the "CCESL Strategic Plan for sharing"). Service-learning statistics for DU are available on page 12 of the "CCESL Strategic Plan for sharing" for years 2000-2008, and these figures show that the number of students in service-learning courses at DU has increase substantially over the years. During the 2001-02 academic year, 287 students participated in these courses; in 07-08, 1,553 students participated. Moreover, with regard to its service-learning programming, CCESL strategically partners with a large number of units on campus, including the Morgridge College of Education; the Graduate School of Social Work; the Daniels College of Business; the College of Natural Sciences and Mathematics; and several departments within the Division of Arts, Humanities, and Social Sciences (CCESL Strategic Plan for sharing, p. 12). More information regarding CCESL's endeavors related to community engagement and strategic partnerships external to DU can be found on page 15-16 of "CCESL Strategic Plan for sharing."

Per CCESL's director, Eric Fretz, CCESL does not collect information regarding how many DU students participate in community service each year or how many student hours each year are contributed to community service (eric.fretz@du.edu).

*Sturm College of Law Public Service Requirement*

Per the website (www.law.du.edu/index.php/public-interest-office/public-service-requirement), the goals of the public service requirement include educating students about professional responsibility, particularly their obligation as attorneys to perform public service; helping students develop lawyering skills; and raising awareness about career and public service opportunities.

The public service requirement may be satisfied in a one of the following ways:

- Internship for credit in a government agency; judicial clerkship; nonprofit organization; private law firm doing pro bono work
- Sturm College of Law student law clinic
- Pre-approved Sturm College of Law course which has a practical public-service component
- Approved public interest practicum

## Financial Incentives for Public Service Careers (AF 16)

### *Rationale*

The University of Denver is committed to encouraging the development of global, engaged citizens working in public service. In recognition of the cost of graduate programs and importance of supporting public service careers, the Sturm College of Law offers a number of financial incentives to its graduates entering into public service.

### *Strategies*

*Sturm College of Law*

The Chancellor's Scholar Program is offered to students with a demonstrated history of excellence in scholarship and public service. The Program awards full tuition, currently valued at approximately $94,000, to a limited number of qualified students committed to public interest issues. The open-competition scholarships are available to entering first-year day and evening division students. The annual scholarships are renewed based upon the scholar's demonstrated ability to meet the program criteria.

The Loan Repayment Assistance Program (LRAP) "promotes and encourages committed students to accept lower paying public interest jobs by providing forgivable loans to repay those students' law school related debt" (http://www.law.du.edu/index.php/alumni/get-involved/lrap). This is in keeping with the "legal community's ethical obligation to provide legal assistance to those with limited access to the legal system." Per Lacey McFall, Financial Management Counselor (Lacey.McFallFoster@du.edu), the LRAP program makes it possible for students both to go into public interest law and to stay in public interest law. Per Lacey McFall (Lacey.McFallFoster@du.edu), for purposes of LRAP, "public interest law" is defined as work for a 501(c)3 organization or for the government. The first few years of public interest work after graduating from law school are financially difficult, so LRAP was created in 2003. The first award through the program was made in 2004. At this time, the program is still very small, with an average of just two awards made per year.

*Daniels College of Business*

Daniels College of Business does not currently offer any financial incentives to MBA graduates who enter public service careers. However, this is something the College might consider in future (csherrod@du.edu).

## Carnegie Designation for Community Engagement (AF 17)

In 2006 the University of Denver received the Carnegie Foundation for the Advancement of Teaching designation and is classified under Community Engagement: Curricular Engagement and Outreach and Partnerships elective classification. The classification is valid for six years. Carnegie defines the Community Engagement classification as:

> Community Engagement describes the collaboration between institutions of higher education and their larger communities (local, regional/state, national, global) for the mutually beneficial exchange of knowledge and resources in a context of partnership and reciprocity.
>
> The classification includes three categories:
>
> Curricular Engagement includes institutions where teaching, learning and scholarship engage faculty, students, and community in mutually beneficial and respectful collaboration. Their interactions address community-identified needs, deepen students' civic and academic learning, enhance community well-being, and enrich the scholarship of the institution.
>
> Outreach & Partnerships includes institutions that provided compelling evidence of one or both of two approaches to community engagement. Outreach focuses on the application and provision of institutional resources for community use with benefits to both campus and community. Partnerships institutions focus on collaborative interactions with community and related scholarship for the mutually beneficial exchange, exploration, and application of knowledge, information, and resources (research, capacity building, economic development, etc.).
>
> Curricular Engagement and Outreach & Partnerships includes institutions with substantial commitments in both areas described above (http://www.carnegiefoundation.org/classifications/index.asp?key=1213)

## Public Policy Engagement (AF 18)

***Rationale***

The University of Denver has engaged in the public policy space as both an active and passive participant. Please see below:

*State Level*

- DU is part of group of a consortium of higher educational institutions that fund a state legislative lobbyist. This lobbyist looks for bills and legislation that can either help or harm higher education and advocates for the consortium. This lobbyist also looks at issues and legislation regarding sustainability in and for higher education.

*Local Level*

- DU has a designated position that stays in touch with public policies that affect the university on a local and regional level.

*Other*

- DU's Institute for Public Policy Studies (IPPS) is committed to the development of tomorrow's policy leaders through an innovative, analytical core curriculum that emphasizes cost-effective, market-based alternatives to contemporary issues. http://www.du.edu/ipps/

- DU's Center for Public Policy and Contemporary Issues embodies the University of Denver's commitment to the study and discussion of new ideas about American society's most critical issues. Founded in 1987, the Center maintains an active program of seminars, forums and publications. The Center recently co-sponsored several large-scale events, including the Hard Choices in Public Policy community forum and a debate over current U.S. policy in Iraq. The Center also awards degrees in graduate and undergraduate level work and has two former governors as its directors. http://www.du.edu/ipps/cppci_overview.html

- DU's Sturm College of Law holds an annual national conference titled Rocky Mountain Land Use Institute that brings together educators, policy makers and other influential people to discuss sustainable and good use land practices. The mission of the Rocky Mountain Land Use Institute is to serve the public interest as an interdisciplinary, non-partisan forum for land use and environmental issues in the Rocky Mountain West. http://law.du.edu/index.php/rmlui

- DU's Strategic Issues Program (SIP) convenes a non-partisan panel of citizens to examine an issue of particular importance to the people of Colorado. The goal is to raise the visibility of important issues with the media, legislators and the public and to develop thoughtful recommendations that reflect the collective insight of panel members. The panel, is in its fourth year, and was founded in 2005. The most recent effort studied the future of Colorado's constitution and made recommendations for improving the constitutional process, some of which were adopted by the Colorado General Assembly. The work of each panel has received widespread recognition and helped shape the state's public policy dialogue. http://www.du.edu/issues/index.html

***Strategies***

In 2009 DU's Institute for Public Policy Studies (IPPS) former three-term Governor and IPPS Co-Director Richard D. Lamm will lead a timely and important exploration of the current health care climate and future of the health care delivery systems of the United States.

In 2006 SIP convened a panel to examine, discuss and write a report on the Colorado's water supply and its future.

In March, 2009 DU held the 18th annual Rocky Mountain Land Use Institute titled "Sustainability: Beyond the Platitudes". The conference brought together scholars, activists, and key stakeholders on issues such as, how to better engage the public in sustainability; techniques by which homeowners and businesses can finance renewable energy improvements, and ways to motivate communities on a local level to fight global warming.

# OPERATIONS

## Subcategory I. Recycling

### DU Recycling Program (OP Pre-Req)

***Rationale***

One of the University's stated goals is: “To achieve financial, operational, human, and environmental resource sustainability.” This is accomplished in part by practicing responsible environmental stewardship.

The mission of Denver University's Recycling Program (see Appendix B for the DU Recycling proposal) is to implement a convenient, safe and cost-effective recycling program that is available to as many people as possible. We rely on participation and feedback from students, faculty and staff to continuously expand and improve upon existing programs, as well as to develop new recycling/sustainability initiatives. Since recycling at DU is just one action the institution and its members may take to increase sustainability, we strive to provide additional information about sustainable living so students are aware of how to lessen their environmental impact.

To this end, we will dispose of unwanted materials and equipment in an ethical fashion that protects both the environment and the people involved in the recycling efforts. Our practices will be fiscally responsible, and comply with all applicable state and federal regulations.

There are three main elements for successful implementation of this program:
- a substantial increase in the number of recycling bins;
- using a single stream (co-mingled) system; and
- a supportive educational campaign.

***Strategies***

*Recycling Bins and Collection*

At Daniels, the goal was to place a recycling bin of equal or larger size next to every trash can within the building. The idea is that there should always be as easy an option to recycle something as there is to trash it. This has proven to be an effective standard at Daniels and we propose the same tactic for the campus wide program. Alfredo Abad, the DU Custodial Director, estimates that there are approximately 2,523 trash cans that would need to be matched with corresponding recycling bins. Broken down, this includes 2,103 office-sized bins and 420 classroom/hallway sized bins. This number does not include those required for residence halls and Greek housing, which are in the process of being calculated.

To promote efficiency and participation, office-sized bins should be emptied at central larger recycling bin locations. This dramatically reduces the time that DU staff will have to allocate for the collection process, and also pushes the faculty and staff to participate

more actively in the program, thereby raising their own awareness and buy-in to the program.

*Single-stream recycling*

The single-stream recycling system at Daniels allows for each recycling bin to accept co-mingled materials, such as paper, glass, aluminum, plastics, junk mail, and cardboard. The convenience factor for this approach significantly increases the quantity of recycling. Further, it also provides for a more simple collection process, and reduces the transportation costs/emissions of collecting different types of materials separately. It should be noted that some controversy has arisen in the past over the contamination issues that increase with single-stream recycling. However, improved technology at the recycling facilities and a consistent supportive awareness campaign at the point of recycling have evolved as effective solutions in outweighing this controversy. Therefore, we propose implementing the single-stream program across campus. Currently, the DU campus (aside from Daniels) uses a dual stream program that requires paper to be separated from plastics, glass, and aluminum. The sparse and inconsistent locations of these various bins are inconvenient for would-be-recyclers and therefore reduces the quantity of recycling for the campus. Further, cardboard, a significant waste product for DU, is only recycled at designated areas and during seasonally high times, such as early Fall when there is a high influx of books delivered to the DU Bookstore.

*Supportive Educational Campaign*

Having a supportive awareness campaign is a key to successfully implementing the proposed recycling program at DU. At Daniels, this campaign included email blasts to students, faculty, and staff, as well as flyers which were either hung above each recycling bins and/or placed on the recycling bin in sticker form. There were also presentations given in classrooms, as well as during orientation programs. The awareness raised through these efforts not only reduces the amount of contamination of the recycling bins, but also places credibility and ownership on the individuals using those bins. To expand the program campus wide, a similar all-encompassing awareness campaign must be included. Daniels is willing to share their marketing strategies for this cause. This includes the phrase, ‘Get Caught Green Handed’, along with a painted green hand logo.

# OPERATIONS

## Subcategory II. Transportation

### Fleet Greenhouse Gas Emissions (OP 25)

***Rationale***

It is a recognized fact that local vehicle usage by University faculty, staff, and students on official business contribute to the overall carbon footprint generated by the University of Denver. Although not as large that produced by energy production, the carbon emissions from our vehicles produce a measurable amount of unwanted carbon. A reduction in mileage driven and fuel used will help to reduce that footprint. The University's Department of Parking and Transportation Services, in association with Facilities and other major users of vehicles on and about our campus are dedicated to exploring ways to reduce our unwanted emissions.

***Strategies***

The University's inventory of "Fleet" vehicles including all University-owned and leased vehicles contributes only .7% of all transportation related carbon emissions. Using this baseline data we can first study our fleet's driving habits to determine where best to institute sustainable programs. A 10% reduction by 2012 is an achievable goal and further reductions through technology are anticipated. While the overall savings will be very slight in relation to other transportation subsections, it is important that the University is seen to lead the way in carbon reduction. The Transportation Subcommittee will be offering a palette of 'best practices' aimed at both short and long term programs designed to positively influence departmental driving habits in a manner calculated to reduce our carbon footprint. The programs could include such strategies as Car Sharing, car pooling, teleconferencing in lieu of travel, transition to low emissions vehicles, encouragement of pedestrian travel, etc.

The fleet will also be examined to determine if the vehicles are suitable for conversion to CNG, electric, or a combination of fuels with an eye to encouraging the use of low emissions vehicles.

### Commute Modal Split (OP 26)

***Rationale***

Those making the daily trip to and from the University of Denver currently use several modes of transportation, but the overwhelming majority continues to drive, most often in single passenger vehicles. Survey data indicates that members of the DU community are not inclined to carpool or utilize the RTD system, seeing it as an inconvenience. DU must address the perceived inconvenience and look for strategies that encourage the use of alternative forms of transportation while still maintaining sufficient parking permit sales to meet current debt servicing for parking structures already in commission and future maintenance and management requirements.

***Strategies***

The University distributed a survey to determine the current commuter modal split. This data confirms that for the foreseeable future single passenger vehicles will remain the transportation mode of choice. Understanding this we can focus our efforts to reduce our carbon footprint in several innovative ways. With technology upgrades to our parking software and hardware we can make commuters aware of their vehicle movement patterns into and out of parking lots. With this information we can creatively address the issue of excess driving (aside from the initial commute). Offering permits based on vehicle usage rather than unlimited access could reduce incidental driving during the day. Offering reduced priced meal plans for faculty and staff could reduce the amount of lunch hour driving. Mandating the use of car-sharing vehicles for fleet transportation could help reduce low payoff incidental driving and encourage efficient use of driving time and fuel. As we continue to address the need to encourage the use of alternative transportation the University might consider compensation for the time lost to commuting via RTD so that loss of time becomes less an issue. Recognizing that as long as automobiles continue to be used by commuters there will still be a carbon emission footprint, it is likely there will be a need to purchase carbon offsets. To help in this area there are ways to pass on this cost, at least in part, to the commuters contributing to carbon emissions. Through education and behavioral modification we can improve our commuter modal split to reduce our by 10% by 2012. Further reductions following from parking management improvement and voluntary contributions to purchase carbon offsets will easily reduce the emissions to the forecast levels by 2020.

**<u>Commuter Options</u> (OP 27)**

***Rationale***

The University must strive to personalize the 'sustainable ethos' for every member of the University's family…faculty, staff, students, and the plethora of both frequent and infrequent visitors to our campus. One common shared experience to which we can all relate is travel to and from the campus. The University is committed to providing ample, convenient, and safe parking for those driving to our campus. At the same time we need to offer alternative commuting options that are sustainable and palatable. Encouraging the use of alternative forms of transportation (other than single passenger autos) will help reduce the carbon emission footprint caused by commuters as they travel to and from campus.

***Strategies***

Using the results of the University's transportation survey as a baseline, the Transportation Subcommittee has looked at ways and methods to accommodate the needs and wants of our commuter cohort. After an examination of benchmark programs available across the country we are now beginning to focus on aggressively educating commuters on the options available to them so that they can take actions to change commute patterns to a more efficient and sustainable one. We began this process several years ago and have already enjoyed success with the distribution of RTD passes to students, staff, and faculty. At the same time we are actively trying to

reduce our carbon emissions we must acknowledge that continued parking permit sales are necessary for the University to meet revenue goals for debt service and parking mangement. To achieve our predicted reduction of 10% by 2012 we will continue to creatively encourage the use of alternative methods of commuting; educating the campus community on the types available, viability and practicability of public transportation. Further reductions in carbon emissions will be realized through improved CAFÉ standards making an overall 15% reduction by 2020 an achievable goal. We will work toward this end by accommodating carpool/van pools; encouraging the use of low emissions vehicles through preferential parking; Car Sharing programs; and Bicycle Sharing programs.

**Air Travel (OP 28)**

***Rationale***

Air travel contributes a significant amount carbon, per mile traveled, to our overall carbon footprint. A reduction in air miles would contribute a disproportionate amount to any savings we hope to accomplish in the transportation arena. With fuel prices trending upwards over time it also makes fiscal sense to reduce air travel whenever possible.

***Strategies***

Through research of past travel the University will determine its baseline air transport mileage. Although there may be some reduction in travel as a natural consequence of reduced budgets for travel, the reduction will mainly come from technological improvements. Through an increased use of video teleconferencing some air miles may be saved. Additionally, forecasts of improvements in the airline industry's fuel efficiency and air traffic control efficiencies will help to lower the greenhouse gas contributions. A 10% reduction by 2012 is achievable. Further reductions are problematic and will carbon emissions due to air travel will probably need to be countered through the purchase of carbon offsets.

**Bike Sharing**

***Rationale***

With Colorado's climate and active culture and the City of Denver's extensive bicycle trail infrastructure, bicycle travel is and will remain an important part of commuting and mobility for the DU community. DU can help to cost-effectively reduce its green house gas emissions by encouraging responsible bicycle commuting and campus travel. To promote this goal, DU will provide adequate bicycle storage in or near university buildings and parking structures, bicycle paths and bicycle lanes as required, and showers for bicyclists in new buildings as often as possible.

***Strategies***

The combination of bicycle accommodation on RTD light rail and busses, DU's eco-pass program and Denver's new bike sharing program offer extensive opportunities for intermodal travel including bicycles. DU will explore methods of facilitating bicycle/intermodal transit for members of its community.

Basic information on bicycle use, bicycle safety, bicycle routes, bicycle security and intermodal transit opportunities will be included in student and staff orientation.

## OPERATIONS

### Subcategory III. Greenhouse Gas Emissions Inventory

### Sustainability Management Plan (AF 9, OP 11)

***Rationale***

The Sustainability Management Plan includes the University's first comprehensive Green House Gas Emissions Inventory. This management plan will focus specifically on potential future Green House Gas (GHG) emission reductions due to modifications toward energy efficiency (building operations), building design (report submitted by Mark Rodgers), on campus power generation, sustainable operation and maintenance practices and the potential future purchase of carbon offsets. The baseline year for comparison will be 2006.

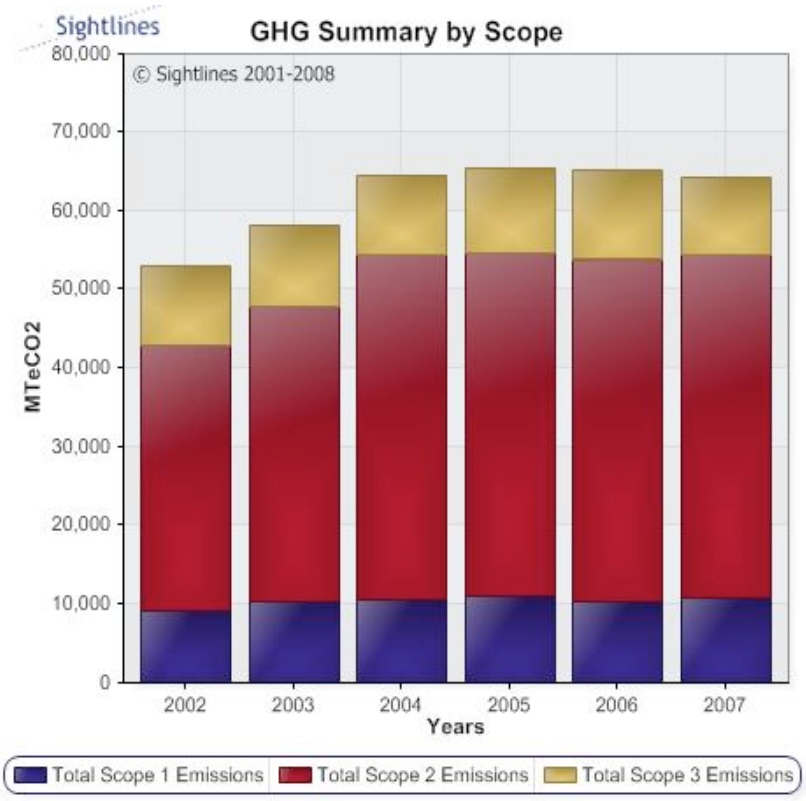
The University of Denver is committed to seeking carbon neutrality by the year 2050 through conservation, reduced consumption, and pursuing appropriate and responsible alternative energy sources. To achieve this goal, the University is working toward a 24% carbon reduction by the year 2020.

A benchmark for achievement of carbon neutrality by 2050 is the anticipated annual cost of carbon offsets based on our estimated emissions. Using our present estimate of 23,790 Tons of CO2 in 2050, the annual cost to achieve carbon neutrality @ $18/Ton and without any generation investment; would be $428,213. This analysis does not include any credit for REC's in 2050, on the assumption that they will not be an acceptable alternative to carbon credits. The Wind Power option outlined below has a positive impact on reducing the cost of neutrality in 2050, though the impact is limited as a result of our previously stated assumption that Xcel will make significant progress in the area of carbon reduction by 2050. I think we can conclude from this initial estimate, that the Fuel Power Cell Generation option has potential on the basis of an investment opportunity and may warrant a more detailed assessment, but none of the options evaluated would be implemented solely as a result of their contribution to carbon neutrality in 2050.

***Strategies***

The first step in the process is garnering an understanding of how the University generates Green House Gas (GHG) Emissions. To that end the University commissioned Sightlines™ to prepare our first GHG inventory. The Sightlines™ report identifies the types of GHG emissions generated by the University. In summary, Scope 1 emissions are emissions generated by the direct activities of the campus, Scope 2 emissions are emissions from utility production not at the institution and Scope 3 emissions are indirect emissions generated by the activities of the people on campus. Areas of focus, for this report are Scope 1 emissions: purchased natural gas, propane, vehicle fuel, fertilizer and refrigerants; as well as Scope 2 emissions which for the University of Denver is solely the purchase of electricity from the local utility provider Xcel Energy.

**Figure 1.**




As indicated in Figure 1, Scope 2 emissions due to the consumption of purchased electricity comprises 67% of the total carbon emissions associated with the operation of the campus. The next largest contributor is the direct consumption of natural gas on campus which accounts for 16% of our total carbon emissions.

## Future Greenhouse Gas Emissions Projections

| | FY2006 | FY20012 | FY2020 | FY2050 |
|---|---|---|---|---|
| **Scope 1 Emissions** | | | | |
| Utility Combustion | 9836 | 9748 | 10675 | 5338 |
| Vehicle Fleet | 196 | 196 | 196 | 196 |
| Agriculture | 5 | 5 | 5 | 5 |
| Refrigerants and Chemicals | 247 | 247 | 247 | 247 |
| **Scope 2 Emissions** | | | | |
| Purchased Electricity | 43484 | 39543 | 33263 | 8238 |
| **Scope 3 Emissions** | | | | |
| Commuting | 10643 | 9579 | 9047 | 9047 |
| Air Travel | 348 | 348 | 348 | 348 |
| Solid Waste | 371 | 371 | 371 | 371 |
| TOTAL Gross Emissions | 65130 | 60037 | 54151 | 23790 |
| Renewable Energy Certificates | -4631 | -9006 | -8123 | 0 |
| Net GHG Emissions (MTeCO2) | **60499** | **51031** | **46029** | **23790** |

| Potential Annual Cost of Mandatory Climate Program (Xcel Estimate) | | | |
|---|---|---|---|
| (@ $9/Ton) | $459,281 | $414,259 | $214,107 |
| (@ $18/Ton) | $918,562 | $828,518 | $428,213 |
| (@ $40/Ton) | $2,041,248 | $1,841,150 | $951,585 |

| | YEAR | | |
|---|---|---|---|
| | 2012 | 2020 | 2050 |
| Net GHG Emissions Projections w/o Generation (MTeCO2) | **51031** | **46029** | **23790** |
| Annual Cost of Carbon Neutrality (est.) | **$918,562** | **$828,518** | **$428,213** |

**FY2012**

Purchased Electricity reduction includes a 15% reduction from 2006 levels as a result of the items outlined in the Energy Efficiency Section of this report in addition to a estimated 5% reduction by Excel Energy

Utility Combustion reduction includes a 12% reduction from 2006 levels as a result of the items outlined in the Energy Efficiency Section of this report

**FY2020**

Purchased Electricity reduction includes a 25% reduction from 2006 levels as a result of the items outlined in the Energy Efficiency Section of this report in addition to a estimated 15% reduction by Excel Energy

Utility Combustion reduction includes a 17% reduction from 2006 levels as a result of the items outlined in the Energy Efficiency Section of this report

**FY2050**

Purchased Electricity reduction includes a 80% reduction from 2006 levels as a result of projections sited by Excel Energy resulting from technology transformation

Utility Combustion reduction includes a 50% reduction from 2006 levels as a result of a transformation technology transformation and growth in energy density leading to an ability to heat buildings via heat recovery methods

**GENERAL**

For the purposes of this analysis we have not included a 2% per year growth in an effort to account for growth in energy intensity as well as new construction through 2020

Renewable Energy Certificates are based on a commitment to purchase a minimum of 15% of the total amount of electrical consumption

## Wind and Fuel Cell Power Generation Analysis

| **Fuel Cell Power Generation** | | | |
|---|---|---|---|
| **400kW Cell for School of Engineering & Computer Science** | 2012 | 2020 | 2050 |
| ***REVISED TOTAL Gross Emissions*** | ***49596*** | ***45076*** | ***24217*** |
| CO2 Reduction | 1435 | 953 | -428 |
| Mandatory Annual Climate Program Savings @ $18/Ton | $25,831 | $17,151 | -$7,696 |
| Savings in gas & electricity for facility heating & cooling | $90,000 | $90,000 | $90,000 |
| Simple Payback (years) | 12 | 13 | 17 |
| Annual Cost of Carbon Neutrality (est.) | **$892,731** | **$811,367** | **$435,910** |

| 7MW Wind Power | | | |
|---|---|---|---|
| **$12 million Investment(*)** | 2012 | 2020 | 2050 |
| ***REVISED TOTAL Gross Emissions*** | ***33435*** | ***31072*** | ***16388*** |
| CO2 Reduction | 17596 | 14957 | 7401 |
| Mandatory Annual Climate Program Savings @ $18/Ton | $316,735 | $269,224 | $133,224 |
| Savings in electricity @ $0.04/kWh (**) | $800,000 | $800,000 | $800,000 |
| Simple Payback (years) | 11 | 11 | 13 |
| Annual Cost of Carbon Neutrality (est.) | **$601,827** | **$559,293** | **$294,989** |

(*)Investment in 2009 dollars

(**) The $0.04/kWh savings was used for comparative purposes and is based on the existing rate structure and a blended total rate of $0.08/kWh. The savings based on an expected rate paid by Xcel for wind energy of $0.04/kWh which is consistent with the rate negotiated by existing developers.

For the purposes of this analysis we have used an estimated cost of a mandatory climate program of $18/Ton, which is the middle of the range used by Xcel Energy. Based on the 400kW Fuel Cell Power Generation investment option, we could potentially offset 1435 MTeCO2 or approximately 3% of our Net Emissions in 2012 through the application of this technology. Given the present uncertainty surrounding the actual cost of carbon offsets, any investment decision made with the information available today, and on the basis of our previously stated measurement criteria (opportunity cost and simple payback) would be very speculative. Ultimately, the payback could be significantly different depending on the outcome of legislation yet to be enacted; therefore it would be advisable to model this option again once the range of costs associated with carbon credits has narrowed.

Although the Fuel Cell Power Generation option has a notable short term impact on our CO2 emissions, it does not have a significant impact on our ability to achieve carbon neutrality by 2050. This is the result of an assumption in our original analysis that Xcel would be able to lower CO2 emissions by 80% due to technology transformation. Ultimately any decision related to generation will need to take into account that as technology is developed, companies who are in the energy business will apply the technology based on their own economic models and make the electricity available to their customer base. In the event we have the ability to utilize the available technology faster or more cost effectively than our utility providers it would make sense to give the investment consideration.

An additional investment option would be to fund the development of Wind Power. Using an estimated cost of $12M for 20,000MWh/year, our initial estimated payback is similar to the payback associated with Fuel Power Cell Generation model, although the cost of carbon credits necessary to achieve neutrality in 2050 is reduced to $294,989. The long term risk inherent with this option is Xcel's assessment of the costs for peak vs. off-peak electricity in a smart grid environment. The range mentioned by a representative of Xcel is from $0.015/kWh to $0.40/kWh. Due to the fact windmills generate a disproportionate amount of power during off-peak hours, it would be logical to conclude that at some time prior to 2050, a payback analysis of wind power could be dramatically affected by a change in the rate structure.

A benchmark for achievement of carbon neutrality by 2050 is the anticipated annual cost of carbon offsets based on our estimated emissions. Using our present estimate of 23,790 Tons of CO2 in 2050, the annual cost to achieve carbon neutrality @ $18/Ton and without any generation investment; would be $428,213. This analysis does not include any credit for REC's in 2050, on the assumption that they will not be an acceptable alternative to carbon credits. I think we can conclude from this initial estimate, that the Fuel Power Cell Generation option has potential on the basis of an investment opportunity and may warrant a more detailed assessment, but none of the options evaluated would be implemented solely as a result of their contribution to carbon neutrality in 2050. Our expectation is that a portion of the dollars needed to offset the carbon footprint in 2050 will be paid in the form of a rider on our electric bill, and the amount necessary to offset the remaining scope 1 and scope 3 carbon emissions will be approximately $280,000.

**Strategies for the rendition of Scope 1 and Scope 2 GHG Emissions**

Energy Efficiency -The goal moving forward is to build on the 13.3 million kWh in savings generated over the past decade through energy conservation measures already implemented on campus. Achievement of the long term energy savings and carbon reduction goals will require the commitment of the necessary financial resources needed for implementation of the strategies identified in this plan. A primary source of funding for future energy savings improvements will be the savings dollars generated from past energy conservation measures, in addition to rebates offered by Excel Energy through their Conservation Wise Program designed to lower the peak demand. Achievement of the carbon reduction goals established by this Sustainability Management Plan will position the University to contribute to a sustainable common good while helping to establish a financial future full of opportunity.

**Measurement of CO2 emissions**

Measurement and tracking of CO2 emissions will allow the University to keep a record of how we are doing with respect to the goals set forth by the Sustainability Management Plan. In addition, the emissions accounting will provide information useful

in the evaluation of potential financial impacts resulting from federal policies which Xcel currently estimates could be in the range of $9 to $40 per ton of CO2. The additional cost of purchased electricity in FY2007, based on our calculated CO2 emissions, would have been in the range of $390K to $1.7M.

The following are key metrics that can be used to track progress towards sustainability over time:

1. Greenhouse Gas Emissions: Tons of CO2 equivalent (which includes carbon dioxide plus other greenhouse gases in the equivalent amount of CO2), calculated on a per square foot of building space basis.

2. Energy: Annual kilowatt hours and millions BTU natural gas.

# OPERATIONS

## Subcategory IV. Energy

## Energy: Conservation, Consumption, & Measurement (OP 8 & 9)

### Energy Conservation Measures

***Rationale***

In efforts to continuously strive for carbon neutrality, the University of Denver is committed to energy conservation as a primary and critical location of climate change reduction. To do so, a number of strategies are proposed.

***Strategies***

1. Demand Control Ventilation – Many areas such as auditoriums, gyms, classrooms and cafeterias are always ventilated as if they were at full capacity. Demand-controlled ventilation systems measure the amount of carbon dioxide present inside the space served, the higher the number of occupants the higher the carbon dioxide levels, then adjust the ventilation requirements accordingly. This reduces energy consumption by only heating and cooling the volumes of outside air needed, based on the number of occupants.

2. Optimize Setback Scheduling – This energy conservation measure saves energy by turning systems off when not in use or in the event certain systems cannot be turned off entirely allows the temperature to reach minimum levels before the heating or cooling functions are initiated.

3. Networked PC Power Management – If a single computer draws 100 watts and is left on unnecessarily overnight and on weekends, it could add $30 or more to the annual energy bill. Presently the University has 1000 desktop computers on campus which could benefit from a centralized power management system.

4. Upgrade to Variable Frequency Drives – Because a VFD operates on an as needed basis, it improves operating efficiency and can save energy as well as reduce the maintenance requirement. This is another opportunity for the application of Xcel rebate dollars.

5. Lighting Upgrades – In the case where outdated lighting exists, replacing with modern higher efficiency lighting can reduce the lighting energy consumption by 35%. Lighting retrofits typically qualify for Xcel rebates.

6. Building Retro-commissioning – This measure is an analysis of the HVAC and lighting controls to ensure the systems are operating efficiently and appropriately. Many buildings over time require tune-ups to maintain optimal performance. Studies have shown retro-commissioning can lead to reductions of 25 percent in annual utility consumption

7. Premium Efficiency Motors – When replacing or upgrading fan, pump or other motors, Xcel Energy offers a rebate incentive designed to offset the added cost of the premium efficiency option. Typically premium efficiency motors can reduce energy consumption by 12%, over the standard efficiency equivalent.

8. Localized Domestic Hot Water – This allows the primary heating system to be shutdown during periods when it would only be used to generate domestic hot water, typically increasing overall efficiency and reducing the amount of gas consumed and carbon generated.

9. Lab Hood Improvements – Lab hoods are generally very energy intensive as a result of the amount of ventilation needed to meet the operating velocity requirement of 100fpm. The velocity requirement is reduced to 6fpm for standby operation, therefore the addition of presence sensors to cycle from operating velocity to standby velocity could save a significant amount of energy.

10. Building Energy Management System Upgrades – Most of the newer buildings on campus have automation systems which allow for scheduling and setback of systems from a central location, as well as remote notification in the event systems fail to shutdown or start.

11. Distributed Heating Plants – This option will be evaluated to reduce the energy associated with transmission of steam necessary where the building is a significant distance from the central plant.

12. Appropriate Ventilation Rates ASHRAE 62.1-2004 standards – Refer to ASHRAE Standard 62.1, 2004 bullet of the Building Design section.

13. Kitchen Hood Ventilation Upgrades – Several of the newer facilities including HRTM and Nagel Hall have utilized a ventilation system which adjusts the ventilation rate based on the level of particulate in the exhaust stream thereby saving significant amounts of ventilation energy during periods of low cooking activity. The system can also be applied to older Hoods to save energy.

14. Heat Recovery – In instances where high levels of ventilation are required such as science buildings, opportunities to reclaim the heat will be evaluated.

15. Continued Maintenance of mechanical systems – Ongoing maintenance helps to keep systems operating near the original design efficiency by reducing the amount of energy needed to compensate for dirty filters, heating and cooling coils and plugged strainers.

Once we have done an assessment each building the various energy conservation measures will be ranked based on the opportunity cost and the anticipated simple payback of the measure. The funds available will then be dedicated to the measures with the shortest payback timeframe.

**Tracking of Energy Use, Savings and CO2 Emissions**

The Facilities Management and Planning Department has selected a Utility Tracking software program specifically designed for the Educational market. This database software allows for the analysis of both cost and carbon emissions data based on past electric, gas and water bills. Comparisons can be performed to show the differences between various buildings, as well as before and after energy conservation measures have been implemented. We also have the ability to adjust the data based on weather differences from year to year such that we do not draw conclusions as a result of an unusually warm or cold period of weather. Several other factors this software takes into account include square footage, billing period length as well as the effect of price changes on cost and consumption, ensuring a fair and accurate analysis when comparing to previous years data.

The ongoing improvements will be tracked using a baseline year of 2006. The baseline will be adjusted based on square footage growth and any increases in energy density requirements, including the addition of air conditioning.

**Behavior Change Campaign**

The Energy Conservation Plan identifies the long-range goals for conservation campus wide.

This plan also serves as a basis for what is considered the responsible use of energy and natural resource at the University. The plan identifies behavior as it relates to the following items:

1. Occupied Temperatures
2. Night Setback Temperatures
3. Responsibility for turning OFF lights
4. Operation of Kitchen Equipment
5. Campus Irrigation Standards
6. Seasonal Heating and Cooling Guidelines
7. Closure of Windows and Doors
8. Ventilation Scheduling

In order for the plan to be successful and to have the intended impact, this plan must be effectively communicated to all levels of the Universities student body, faculty and staff. Communication of the Energy Conservation Plan will encompass a variety of media and interactions as follows:

1. Facilities Website
2. Work Order system and reporting instrument for energy related maintenance needs
3. New Employee and Student Orientation
4. Building Survey interface with key personnel
5. E-mail system

6. New or updated policies should include appropriate aspect of the plan
7. Sustainability Council Updates

Additional opportunities for communication of the progress in future months and years include:
1. Issuance of an annual progress report card and annual sustainability report.
2. Reporting of energy consumption on a monthly basis in comparison to base year statistics.

The reporting tools would also allow for a percentage of the dollars saved to be earmarked for redistribution on a per building basis, to supplement the budgets of the departments who are directly responsible for the behavior in the area they occupy. This type of incentive could provide significant encouragement in a time when many departments are being asked to find way to reduce budgets.

# OPERATIONS

## Subcategory V. Building & Maintenance

## Building Design and Assessment (OP 1, 2)

### Initial Building Design

Many of the buildings on campus were built during times when neither energy or carbon footprint were significant considerations. As a result we need both a forward and backward looking plan. In today's marketplace we have a great deal more information on the effect of building design as it relates to the sustainability of our planet. We also have a much greater range of building components and processes from which to choose, in an effort to minimize the environmental impact associated with the construction and operation of a building. In recent years the University has established a policy that all new campus construction will be built to the LEED Silver standard or equivalent. This standard takes into consideration many aspects of the construction and operations process and is intended to ensure efficient and environmentally friendly performance of a building and its occupants over time.

Although it is early in the history of Nagel Hall, the latest LEED designed building to be constructed on campus, a recent evaluation of the carbon emissions of Nagel Hall show an annual reduction in CO2 of 42,000 lbs., and a cost savings of over $45,000.00 when compared to the emissions and costs of operating Nelson Hall, which was designed and built prior to the LEED standard (see Appendix D for LEED points chart).

The Facilities Management and Planning Department is performing a cross functional review of the construction documents in an effort to standardize energy savings strategies across the campus, and ensure each new or upgraded building is both environmentally friendly, operationally sound and reliable. Ultimately the success of a design is in the application of the design, we will be judged on the basis of the comfort attained and the utility bills in comparison to other buildings of a similar use.

The following building design standards are required to be used in the development of design documents for new construction and retrofit projects:

1. ASHRAE/IESNA Standard 90.1, 2004
a. Minimum Equipment Efficiency
b. Controls
c. Duct and piping Insulation
d. System Balancing
e. System Commissioning
f. Lighting (ex. occupancy sensors in classrooms, conference rooms and break rooms)
g. Energy Star-labeled lighting products
h. Ventilation

2. ASHRAE Standard 62.1, 2004
a. Minimum Ventilation Requirements – The 2004 standard lowers the ventilation rate for most occupancy categories, for example the ventilation rate for a conference or meeting room is reduced by 69% under the revised standard. This presents an opportunity to reduce the cost of operating the HVAC system based on a simple adjustment.

b. Xcel Energy NEMA Premium Efficiency Standard – This standard in addition to providing an opportunity for Xcel rebate dollars, also assures the design includes motors which will minimize the consumption of electricity over the life of the motor.

c. Energy Star-labeled lighting products – This standard not only provides an opportunity of Xcel rebate dollars but also assures the design includes lighting products which are environmentally responsible.

**Existing Building Assessment**

The energy profile of each building is based on a variety of factors, including the use for which the building was originally designed. Research labs tend to have a very different profile from a typical classroom facility. The initial goal of our assessment is to answer the following questions:
1. What are the comfort and environmental requirements?
2. When is the building occupied?
3. Are there outdated mechanical or lighting systems?
4. Where are the energy savings opportunities?

On campus, the variety of designs and usage result is a wide range of carbon footprints. Our goal will be to determine the specific requirements of each building, then explore improvements which will allow for greater efficiency while meeting the facilities functional needs. The range of improvements contained in our evaluation process include the measures referenced in the previous section titled Energy Conservation Measures.

# OPERATIONS

## Subcategory VI. Custodial Operations & Dining Services

### Sustainable Custodial Operations and Maintenance Practices (OP 4)

***Rationale***
It is critically important to the University of Denver that environmental awareness and energy conservation is routinely practiced by the Custodial Department to reduce the environmental consequences of its activities.

***Proposed Strategies***
- Incorporate the principles of energy efficiency and sustainability in its cleaning operations, which embrace green principles and practices; e.g., lighting during night cleaning operations should be limited to those areas in which the crews are operating.
- Minimize the amount of University generated waste sent to the landfill by supporting an aggressive recycling program. Custodial recycling vehicles are NG powered, providing a carbon-free mode of transportation.
- Utilize the University's Purchasing power to gain ready access to effective, green-cleaning products. An added benefit of green-cleaning products is employee safety. Also, green-cleaning products should demonstrate other sustainable aspects such as packaging having organic origins and being fully recyclable.

Custodial management will continue to study the available green products on the market in order to determine which best fits the institutional cleaning requirements as well as meets its green and sustainable criteria.
The use of non-toxic, biodegradable cleaning products has been a University standard for years. Areas that are currently being researched are:
- products like trash bags/liners that break down rapidly in a land-fill environment and can be considered compostable
- paper products that are, to some degree, generated from recycled paper material yet safe, practical and hygienic

The custodial area has, and continues to play, a key role in attaining the University's green and sustainability goals by identifying and fostering additional reduction in the University's carbon footprint.

### Local and Fair Trade Food (OP 5, 6, 7)

***Rationale***
In its commitment to sustainability, the University of Denver recognizes the importance of local and fair trade food purchasing. As such, between 5 and 10 percent of all food purchases, including meats and produce, come from 30 local producers and the

university purchases milk from a local dairy. All coffee on campus is certified fair trade or organic.

***Strategies***

Sodexho, the contracted food supplier and catering service of the university employs the following sustainable practices:

- Offers Fair Trade Coffee
- Offers Organic Coffee
- Offers Rainforest Alliance Coffee
- Sustainable Seafood
- Hormone and antibiotic free milk
- Green Seal Chemicals – Eco Lab Geo system and Apex products
- Dioxin Free – napkins
- Trans fat free
- Reusable food donation program in partnership with the Rocky Mountain Food Bank
- Low flow disposal system

Sodexho has plans to employ the following sustainable practices:

- Provide Local product options – Locally or regionally grown products
- Bio-mass packaging in all dining halls and retail outlets – Spudware, combination of paper, bagasse (Sugar resin pulp) and PLA (Ceraplast corn bi-product)
- Bio Diesel conversion for delivery vehicles
- More bulk and less portion control packets
- Commercial Composting using Alpine Waste Solutions
- Provide only Fair Trade Certified, Organic Certified, or Rainforest Alliance Certified Coffee.
- No longer use trays in all cafeteria operations in order to conserve water and reduce food waste
- Implement the eco-cup program*. Customers will have the option of “borrowing” a reusable coffee mug and returning it to Sodexo where it will be cleaned and redistributed to retail locations.

*The Eco-Cup program is a student-led initiative to lower the amount of paper and styrofoam cups that end up in our landfills. In this program, University refreshment areas will serve drinks in metal hot cups that can be taken with the student and returned at any other refreshment area on campus. At the end of the day, these cups will be washed and redistributed to their original locations.

# OPERATIONS

## Subcategory VII. Grounds

### Organic Campus (OP Credit 12)

***Rationale***

The University of Denver (DU) maintains a 125-acre campus that offers a place of beauty and solitude for students, faculty and staff to more fully engage in the learning environment. This campus, however, does require considerable amounts of resources to maintain its appearance in accordance with the expectations and traditions kept by the University. As a signatory to the Presidents Climate Commitment, the DU Facilities Management & Planning staff must consider the impact of the fertilizers, pesticides, potable water and other natural resources used to maintain the campus and landscaping in and around the University's improvements (buildings, dorms, parking structures) on campus.

***Strategies***

In accordance with AASHE STARS program, the Facilities Management staff will explore the sole use of organic fertilizers and pesticides, as specified by the United States Department of Agriculture (USDA), for all future fertilization and pest-management needs.

Dependent upon efficacy and cost restrictions, the Facilities Management staff will implement the use of such products in order to lower the carbon footprint generated by fertilizers and pesticides that intrinsically contain a high amount of embodied energy and detrimental effects to the natural environment. The runoff from such fertilizers adds unneeded pollution to our sewage system.

The University will also explore the use of xeriscaping. Xeriscaping and xerogardening refers to landscaping and gardening in ways that reduce or eliminate the need for supplemental irrigation. Some common plants used in Western xeriscaping are agave, cactus, lavender, juniper, sedum and thyme.

## ADMINISTRATION & FINANCE

### Subcategory I. Policy

**<u>Sustainability Council</u> (AF Pre)**

***Rationale***
A University community must rely on a representative body to plan and implement its commitment to sustainability.

***Strategies***
In October 2007, under the aegis of Provost Gregg Kvistad, University of Denver students, faculty and staff began a series of meeting to create a University-wide administrative mechanism to implement the American and University Presidents' Climate Commitment, signed by Chancellor Robert Coombe in June 2007.

In January, the group adopted by-laws and became the University of Denver Sustainability Council.

The University of Denver Sustainability Council incorporated multi-take holder representation with five seats assigned to faculty, five to staff and five the students. representatives of both University administrative units and University constituent groups also sit on the Council. The Council meets at least once a month.

The Sustainability Council by-laws adopted on January 22, 2008 (see Appendix A).

**<u>Sustainability Officer and Inter-Campus Collaboration</u> (AF 10, 12)**

***Rationale***
The University of Denver's commitment to sustainability generally and its commitment to carry out its obligations under the Presidents' Climate Commitment in a consistent effective manner will require full-time sustainability staff.

***Strategies***
During the 2009-2010 Fiscal year (or as soon thereafter as possible), the University of Denver will hire a full time sustainability coordinator. The sustainability coordinators' duties will include.

1. Ensuring that DU meets its sustainability goals.
2. Shaping future sustainability goals for DU.
3. Coordinating and documenting University sustainability efforts
4. Maximizing educational opportunities associated with DU's sustainability efforts.
5. Coordinating DU's sustainability efforts with complementary efforts in local, state and federal governments

6. Coordinating DU's sustainability efforts and Collaboration on Sustainability with other Colorado universities.
7. Recognizing and publicizing sustainability efforts within the DU community
8. Coordinating DU's participation in regional, national and international sustainability conferences.
9. Ensuring that the University of Denver meets all reporting requirements for the Presidents' Climate Commitment and all other sustainability assessment systems for institutions of higher education that the Sustainability Council and University administration deem significant.

## Diversity Policy and Personnel (AF 19, 20, 21, 22)

### *Rationale*

The University of Denver recognizes the importance of social justice in creating a sustainable world. As such, the University is committed to diversity as "one mark of a leading university is its commitment to diversity and the concomitant practice of recognizing and valuing the rich experiences and world views of individuals and groups" (Coombe, Diversity Statement, 2008). The Chancellor's statement on diversity explains, "Diversity yields many benefits to institutions that successfully cultivate diversity within their educational, research and community service activities." Institutional commitment to diversity in administration furthers the university's commitment to sustainability as it seeks to advance the institutional vision for inclusive excellence and social justice. In working to build a global citizenry and sustainable society, the university is dedicated to bringing together diverse individuals and groups as it seeks "to be a leader in the creation of a more inclusive and just world" (Coombe, Diversity Statement, 2008). A number of organizational elements work together to achieve this goal, including, a university-wide diversity committee, a chief diversity officer, the university non-discrimination policy, and the university diversity plan and statement.

### *Strategies*

- In 2006 Vice Chancellor Tom Willoughby appointed a full-time Diversity Officer to support efforts at increasing representation of students and faculty from underrepresented groups.
- In 2007 the University established a university-wide diversity committee; the Campus Climate Council (including students, staff, and faculty) charged with advising the Chancellor on matters of diversity and aimed at increasing inclusive excellence.
- In 2008 the University added "gender identity" the non-discrimination policy, that policy now reads: "It is a violation of this Policy to discriminate in the provisions of educational or employment opportunities, benefits or privileges, to create discriminatory work or academic conditions, or to use discriminatory evaluative standards in employment or educational settings if the basis of that discriminatory treatment is, in whole or in part, the person's race, color, national origin, age, religion, disability, sex, sexual orientation, gender identity, gender expression, marital status, or veteran status."

- In addition to being a pillar of the university mission and values, the Chancellor has issued a diversity statement (http://www.du.edu/chancellor/diversityStatement.html) to articulate the importance of diversity to the work of the institution.
- The university maintains a list-serv available for all students, staff, and faculty involved in diversity work to maintain communication and collaboration.

**Recruiting for Student Diversity (AF 23)**

***Rationale***

The Chancellor's statement on diversity explains, "Diversity yields many benefits to institutions that successfully cultivate diversity within their educational, research and community service activities." Institutional commitment to diversity in administration furthers the university's commitment to sustainability as it seeks to advance the institutional vision for inclusive excellence and social justice. In working to build a global citizenry and sustainable society, the university is dedicated to bringing together diverse individuals and groups as it seeks "to be a leader in the creation of a more inclusive and just world" (Coombe, Diversity Statement, 2008). Consistent with the Chancellor's and University's position, the Enrollment Division values both inclusiveness and diversity in its efforts to attract students to the University of Denver.

***Strategies***

The Enrollment Division has a Director of Diversity Enrollment who focuses on the recruitment efforts of under-representative groups of students.

- Outreach
  - Spring Visit Initiative - assists high-need and unrepresented student populations with arranging their visits to DU.
  - Homeward Bound – train DU students to conduct DU presentations at their home high school
  - Work with the Asian Bar Association to bring in Asian students from Denver Public Schools (DPS).
  - Participated in workshops and college fair for Minority Engineering Program at the Colorado School of Mines
  - Volunteers in Partnership Program (VIP) – host students from five Denver schools through our campus visit program
  - Participated in the Native American Pre-Collegiate (college presentations and college fair) Summer Workshop at CU-Boulder
  - Denver Scholarship Foundation – participated in DPS school visits, financial aid evenings, bus-in program
  - Participated in the Denver and Pueblo National Hispanic College Fairs
- Partnerships
  - Daniels Fund Program – participate in educational partner training and DU information session for SHIFT program.
  - Provided financial support for visiting students groups from the five VIP program schools

- Educational Sponsor of Leadership Program at the La Raza Youth Leadership Institute
- Partner with DU's Center for Multicultural Excellence in sending congratulation notes to all admitted students of color.
- Partner with the DULAA group on recruitment initiatives for admitted Latino students
- Partner with the A4 student group on recruitment initiatives for admitted African American students

**<u>Support Programs for Under-represented Groups</u> (AF 24)**

***Rationale***
In working to build a global citizenry and sustainable society, the university is dedicated to bringing together diverse individuals and groups as it seeks "to be a leader in the creation of a more inclusive and just world" (Coombe, Diversity Statement, 2008). Consistent with the Chancellor's and University's position, there are several support programs on campus for under-represented groups of students.

***Strategies***
Center for Multicultural Excellence – changed from Office of Multicultural Affairs in 2002. In 2002, the name of the Office of Multicultural Affairs was changed to the Center for Multicultural Excellence (CME to reflect a different philosophy and perspective regarding campus diversity. More specifically, the change represents a movement away from the deficit model which conceptualizes diversity as a problem involving disadvantaged, under-prepared, and culturally deprived people to an asset-based validation model that conceptualizes diversity as an asset involving talented and gifted individuals who contribute to he very teaching, learning, service, and research mission of the University of Denver. In addition, CME began to work with faculty, staff, students, and alumni using a more inclusive definition of diversity which includes race/ethnicity, gender, religion, sexual orientation, disability, nationality, age, and other salient social dimensions encountered at DU.
Programs offered on campus for under-represented groups Diversity Summit, Community of Excellence scholars, Diversity and Unity Retreat, Excelling Leaders Institute, Profiles of Excellence, Voices of Discovery, Women's Circle Luncheon Series, LGBTIQ and Allies Celebration Gala, Student with Disabilities, African American Student Services, Diversity Workshops, Social Justice Ally Institute, Volunteers in Partnership Program.

**<u>Support Programs for Under-represented Ph.D. Candidates</u> (AF 25)**

***Rationale***
Consistent with the Chancellor's and University's position, there is a support program on campus for under-represented Ph.D candidates. Every summer, the University of Denver hosts a national summer institute designed to address the underrepresentation of faculty of color and women in academia. Entitled

"Promoting Multicultural Excellence in the Academy," the institute is hosted by the DU Office of Multicultural Faculty Recruitment and Retention within the Center for Multicultural Excellence, and the Office of Graduate Studies and Research at the University of Denver. Now in its second year, the institute has hosted a total of 36 doctoral students of color and women representing 16 universities including Harvard, Columbia, Maryland, Michigan, Arizona, CU-Boulder, University of Denver, Berkeley, UCLA and Stanford. For the past two years, staff of the institute have identified a diverse group of doctoral candidates represent a variety of disciplines including political science, engineering, higher education, sociology, psychology, modern thought and literature, sociology, German studies, Spanish, English, history, library information science, counseling psychology, human communications and social work.

***Strategies***

The National Summer Institute at the University of Denver:
Promoting Multicultural Excellence in the Academy
Goals of the institute are:

- for participants to clarify their goals in relation to pursuing a faculty career
- to provide doctoral students of color and women with the necessary information to prepare them for faculty positions in higher education
- to increase the national pool of potential faculty of color and women by preparing participants to be competitive in the job market
- to bring these highly qualified and sought after scholars to Denver with the hope that they will eventually seek employment and diversify applicant pools at the University of Denver (DU)
- to develop a national network of faculty of color and women in academia with the hope of increasing the national pipeline of available faculty of color

To pursue the goals outlined above, the four-day institute consists of seminars focusing on strategies for completing the dissertation; preparing a curriculum vita and cover letter; negotiating faculty contracts; publishing; balancing research, teaching and community service; understanding the tenure process; preparing a job talk; seeking and valuing mentoring and networking; the politics of obtaining tenure; and overcoming various employment obstacles and challenges. National experts from around the country are invited to present on the various topics providing participants with practical, current and cutting edge information, and insight into the process of entering the academy.

**<u>Sustainability Recognition Program</u> (AF 11)**

***Rationale***
To raise community awareness regarding DU's sustainability efforts and recognize the contributions of outstanding individuals and groups to that effort, DU will establish a series of Sustainability Awards.

***Strategies***
The DU sustainability awards will be granted to both DU community individuals and DU departments who make outstanding contributions to sustainability efforts at the University of Denver.

The selection of recipients for the awards will be made by the DU Sustainability Coordinator in consultation with the DU Sustainability Council.

**Sustainable Compensation (AF 27)**

***Rationale***
The University Of Denver Department Of Human Resources commits to fostering a community of inclusive excellence through strategic leadership and service of the highest quality.

Consistently striving to accomplish this:

- We assist the University community to recruit and retain excellent faculty and staff by developing, enabling and supporting an environment that enables employees to be engaged, innovative, have integrity, and empower greatness.
- In order for employees to realize their full potential in the workplace we provide personal and professional development opportunities.
- We help people, units and the University align actions and knowledge to achieve goals by increasing knowledge and skills, improving processes, and implementing appropriate technologies so that work gets done efficiently and effectively.
- We support effective decision-making at the University by providing information and guidance relative to human resource processes, systems and data.

***Strategies***
*Compensation Philosophy*
The University of Denver recognizes that to fulfill its mission it requires a diverse group of highly qualified employees – educators, researchers, administrators and support staff. To ensure that faculty and staff are recognized and rewarded appropriately for their contributions and that University resources are used efficiently and effectively, the University supports a compensation system that:

1. Provides comprehensive compensation (base salary, supplemental payments, and benefits) that is competitive within the appropriate labor market and is aligned with the availability of institutional and unit resources.
2. Attracts highly skilled and competent employees and retains them by providing opportunities for learning, growth and career development.

3. Encourages and rewards excellent performance by individual staff and teams and assures contributions toward meeting the mission, goals and objectives of the University by basing salary increases on merit and performance.
4. Assures a fair “living wage” for all employees who work full time.
5. Provides academic and administrative units flexibility in applying the principles of the University’s compensation system.
6. Allocates compensation in a fair yet flexible manner in compliance with all applicable legal requirements.
7. Balances the need for internal equity while recognizing the desire to be market competitive subject to resource availability.
8. Assures communication of system principles, goals, design, procedures and relevant external market information to all units and individuals.
9. Remains open to emerging compensation practices to address changes in the workforce and the workplace over time.

**Faculty & Staff Benefits (AF 28)**

***Rationale***
The University Of Denver Department Of Human Resources commits to fostering a community of inclusive excellence through strategic leadership and service of the highest quality.

Consistently striving to accomplish this:

- We assist the University community to recruit and retain excellent faculty and staff by developing, enabling and supporting an environment that enables employees to be engaged, innovative, have integrity, and empower greatness.
- In order for employees to realize their full potential in the workplace we provide personal and professional development opportunities.
- We help people, units and the University align actions and knowledge to achieve goals by increasing knowledge and skills, improving processes, and implementing appropriate technologies so that work gets done efficiently and effectively.
- We support effective decision-making at the University by providing information and guidance relative to human resource processes, systems and data.

***Strategies***
Employees eligible to participate must satisfy the requirements of both paragraphs 1 and 2 below. Only service in an **appointed** position classification shall count toward eligibility toward benefits.

1. The employee must hold an "appointed" position, either permanently or as a temporary replacement. An appointed position is defined as:
   - one numbered in the University's Position Control System and budgeted as an identifiable salary item in the University's Approved Budget; or
   - one carrying the word "Research" in its official title.

(NOTE: Student "research" positions associated with educational pursuits, however, are not eligible, e.g. Graduate Research Assistant.)

2. The appointed position must require work of at least half-time where "half-time" position is defined as:
   - 20 hours or more per week for 6 or more months; or
   - requiring a quarterly teaching load of no less than half the load expected of full-time faculty in the department and receiving a salary of no less than half that of the lowest full-time appointed faculty member in that department for two or more quarters.

Employees on approved sabbatical leaves who otherwise are eligible to participate in the Fringe Benefits Program continue to be eligible. Employees holding an eligible position classification and working less than full-time receive prorated benefits based on the percentage of time worked.
The University of Denver offers a choice of group health plans to eligible employees.

**Graduate Student Employee Benefits (AF 29)**
Health Insurance Scholarship for Graduate Teaching and Research Assistants
The GTA/GRA Health Insurance Scholarship covers the cost of the DU Health Insurance Plan in addition to the Health & Counseling Center Fee. Eligibility is determined one time per year, in the fall.

Eligibility
To be eligible for the GTA/GRA Health Insurance Scholarship, graduate assistants must meet the following criteria:

- Have a full-time appointment as a GTA or GRA for the fall, winter, and spring quarters.
- Have a tuition waiver offer from your department averaging at least 8 credit hours for the fall, winter, and spring quarters (for a total of at least 24 credits).
- Register for and complete an average of 8 credit hours during the fall, winter, and spring quarters (for a total of at least 24 credits of actual course work, not including Continuous Enrollment).
- Must not be registering for Continuous Enrollment (CENR) alone in any one of the three quarters.
- Must return the completed eligibility form indicating “Accept” by the annual fall quarter deadline.

After receiving the Heath Insurance Scholarship, failure to comply with any of the above listed rules may result in a hold being placed on the student’s account. The hold will not be removed until the student has re-paid the Health Insurance charges.

**Parental Leave (AF 30)**

***Rationale***
The University Of Denver Department Of Human Resources commits to fostering a community of inclusive excellence through strategic leadership and service of the highest quality.

Consistently striving to accomplish this:

- We assist the University community to recruit and retain excellent faculty and staff by developing, enabling and supporting an environment that enables employees to be engaged, innovative, have integrity, and empower greatness.
- In order for employees to realize their full potential in the workplace we provide personal and professional development opportunities.
- We help people, units and the University align actions and knowledge to achieve goals by increasing knowledge and skills, improving processes, and implementing appropriate technologies so that work gets done efficiently and effectively.
- We support effective decision-making at the University by providing information and guidance relative to human resource processes, systems and data.

***Strategies***
The Staff and Faculty Paid Parental Leave program was implemented in 1997.

*Faculty Paid Parental Leave*
Faculty members may have one academic term of paid leave, drawing first on their 31 days of sick leave, during pregnancy and the first year after birth, adoption, or foster care of a child whether because of pregnancy-related disability or for child care. If a faculty member previously has taken sick leave or disability leave (as permitted by applicable leave policy) due to a serious pregnancy-related illness, Parental Leave will still be available once the child is born in an amount up to one full academic term.

*Terms of Eligibility*
Faculty members who have not been employed in a benefited faculty position at the University for one full academic year prior to a parental leave must complete a full academic year of employment following the leave or reimburse the University for the salary dollars received during the leave period.

In cases where the birth mother is taking Parental Leave, the paid leave will be in conjunction with the University's current Core Short Term Disability Benefit when applicable.

*Pregnancy, Childbirth or Adoption Leave*
Appointed staff members may have up to ten weeks of paid parental leave, during pregnancy and the first year after birth or adoption of a child, whether because of a pregnancy-related disability or for child care. In cases where the birth mother is taking Parental Leave, the paid leave will always be in conjunction with the 60% Core Short Term Disability Benefit. Employees who have completed less than one year of appointed, benefit-eligible service would receive 1/3 paid leave and the remaining 2/3

would be paid by the employee drawing first upon unused sick accrual and then vacation accrual. Appointed, benefit-eligible employees who have completed between one and two years of service would receive 2/3 paid leave and the remaining 1/3 would be paid by the employee drawing first upon unused sick accrual and then vacation accrual. Employees who have two years or more of service would receive full paid leave without drawing upon unused sick or vacation accruals.

*Eligibility*
All appointed employees are eligible to receive up to ten weeks of paid parental leave, (if an employee elects to take their 12 weeks as eligible under Federal Law those additional two weeks would be unpaid, or the employee could use their sick and vacation accrual to cover those additional two weeks).

**Domestic Partner Benefits (AF 31)**
***Rationale***

The University Of Denver Department Of Human Resources commits to fostering a community of inclusive excellence through strategic leadership and service of the highest quality.

Consistently striving to accomplish this:

- We assist the University community to recruit and retain excellent faculty and staff by developing, enabling and supporting an environment that enables employees to be engaged, innovative, have integrity, and empower greatness.
- In order for employees to realize their full potential in the workplace we provide personal and professional development opportunities.
- We help people, units and the University align actions and knowledge to achieve goals by increasing knowledge and skills, improving processes, and implementing appropriate technologies so that work gets done efficiently and effectively.
- We support effective decision-making at the University by providing information and guidance relative to human resource processes, systems and data.

***Strategies***
The University implements its policy of non-discrimination on the basis of sexual orientation and extends employee benefits and privileges wherever possible, to registered domestic partners and families of employees, to the same extent that such benefits are provided to the spouses and families of married employees or common law partners.

Employees must certify their eligibility for these benefits by means of an affidavit. Certain tax consequences may apply. Forms and additional information are available from the Benefits Office.

## ADMINISTRATION & FINANCE

### Subcategory II. Purchasing

**Purchasing Policy (including ENERGY STAR & EPEAT Purchasing) (OP 19, 20)**

***Rationale***
The Vice Chancellor of Business and Finance has endorsed a process to begin development of a green purchasing policy that will document the University's intent to purchase using sustainable methods. It will encourage the use of the University's soon-to-be-developed green purchasing website that will assist individual buyers on campus in understanding the social and environmental impacts of their purchasing. The website will provide information about suppliers and reference Energy Star (http://www.energystar.gov/ ) and EPEAT (http://www.epeat.net/ ) websites. In conjunction with the currently approved recycled paper purchasing policy, our partnership with Adidas for logo apparel, and partnership with Corporate Express for office supplies (http://www.corporateexpress.com/ ), our green purchasing efforts are moving toward increasingly sustainable practices.

***Strategies***
Currently, the University of Denver Office of Risk Management recommends to individuals living in the residence halls to purchase ENERGY STAR computers for their rooms (http://www.du.edu/risk/ResidenceHalls.html ).

The number of computer products on the EPEAT site includes all major brands we currently purchase. With this and many purchasing policies there are discussions with the director of Business Services that are on-going concerning revising our policies on several fronts. While there are deep budget cuts on the horizon that will impact the University's buying power, there is hope that while we are revising policies for more frugality will be hand-in-hand with sustainability will offer the opportunity to incorporate prudent and sensible guidelines on these issues as well.

**Environmentally Preferable Paper Purchasing (OP 22)**

***Rationale***
Our Sustainability Council has supported a move to all recycled paper purchasing by our Purchasing Department. The entire campus, except some high-use, high-speed printers in our University Technology Services area have been transitioned. There were issues with paper jams with earlier tests of recycled in these machines. They are now testing different recycled paper brands to find one that works properly. Once this process is complete the Council's motion will be in action.

Our contract for letterhead and envelopes is due for renewal and as a part of the new request for proposals recycled paper will be required by our University Communications office.

***Strategies***
While the two movements above will cover much of the University's activity we need to consider the individual buyers in the multitude of offices around campus.

**<u>Independent Monitoring of Logo Apparel</u> (ER 33)**

***Rationale***
The University of Denver purchases logo apparel from Adidas. They have a corporate responsibility and sustainability program (http://www.adidas-group.com/en/sustainability/welcome.asp).

***Strategies***
The sustainability principles of Adidas include:
Legislation
- We adhere to social and environmental laws, directives and guidelines while continually improving upon our own contribution to a sustainable society.

Management
- Analyze, evaluate and assess the social and environmental impact of new products, technologies and processes at the design and development stage
- Set up clear targets, formulate an action plan and monitor progress
- Publish the results.

Supplier and customer relationships
- We expect suppliers' activities to be compatible with our Workplace Standards. We work in partnership with them to improve our collective performance. We encourage our business customers to take a proactive stance on the social and environmental impact of their own activities.

Support
- We support social and environmental projects and develop partnerships with businesses and organizations whose direct and indirect output contributes to a sustainable society.

Stakeholder dialogue
- We aim to listen, respond and interact with all stakeholders in an atmosphere of mutual trust and respect. We provide them with appropriate information related to the social and environmental performance of the Group on a regular basis.

## Administration & Finance

## Subcategory III. Investing

**<u>Socially Responsible Investment</u> (AF 4)**

***Rationale***

Many schools have become involved in efforts to improve the business practices of those corporations in which they are invested because they are chartered as non-profit institutions, and therefore have a special obligation to act in the public interest. A movement toward socially responsible investing (SRI) is rapidly gaining momentum. Recognizing the importance of SRI and its relevance, the University of Denver's Board of Trustees takes ethical factors into account when exercising its fiduciary responsibility in setting investment policies and making investment decisions.

As such, in May 2006, the University of Denver invested $250,000 in the Global Commercial Microfinance Consortium. The Consortium increases the ties between mainstream financial institutions and microfinance groups. By working to strengthen the microfinance industry and providing local currency financing to microfinance institutions, the fund expands the capital available to poor individuals and communities worldwide. The fund is managed by Deutsche Bank and is comprised of a diverse investor group, which includes institutional investors as well as government agencies.

***Strategies***

Some background on how the Deutsche Bank/DCB partnership started. The Daniels College of Business is committed to providing our students with a significant international experience. One type of experience is with program/project work in which students have a chance to engage in a significant project that will take place over a period of time, requiring multiple student visits with each one having a set of goals that build to a final conclusion over several years. This requires each different student group to build on the previous groups' progress. The first project of this type was in Durress, Albania helping to build a sustainable community in Keneta, one of the poorest areas of the city. The sustainability model used the Millennium Development Goals as an organizing framework. Students were graduate students in International Studies or Daniels College of Business. We partnered with two of the most prominent universities in Albania who supplied students from their business, social studies, and engineering programs to provide the ability to have cross cultural interdisciplinary teams of students taking on projects and conducting community service while in Albania.

In order to understand the context for development and how policy and business intersect, we first visited NY and the United Nations. We also arranged a meeting with Deutsche Bank's microfinance division because of the growing importance of microfinance in developing countries and in achieving sustainable solutions to poverty and environmental degradation. We met with the Director of DB's Microfinance Division (Asad Mamood) which controlled a $75 million fund for loans to Microfinance Institutions around the world. After his presentation and Q&A with the students, I told him about our

program and our schools commitment to issues of ethics, sustainable development and corporate social responsibility. He was impressed with the student's knowledge and enthusiasm and the direction of our program.

He asked us if we would be interested in being Deutsche Bank's educational partner in the Microfinance Fund. We have been working with them for several years now and are their sole educational partner. Our student's take two courses—one in Social Entrepreneurship and Microfinance and another in The Microfinance Project. In the latter, they are given one or more "live" projects to evaluate loan applications or loan performances of MFIs seeking funds from DB. Students interact with DB officers and their project papers are part of the final evaluation process. This year our students are also doing due diligence research on site of the loan applicants. Currently, over Spring break, they are in Cambodia doing research. At this time, 100% of the original investment is fully allocated and the University expects to receive its first dividend in 2010.

Additionally, the University of Denver's Board of Trustees resolved on April 17, 2007 to adopt a Sudan Investment strategy by implementing the Sudan Divestment Task Force's guidelines for targeted divestment of companies doing business in Sudan. The Sudan Divestment Task Force (SDTF) is the coordinating entity for the targeted Sudan divestment movement which provides support to individuals, fiduciaries, asset managers, and government officials who are involved in targeted Sudan divestment campaigns around the world. Since the SDTF was established in 2006, over two dozen U.S. states, fifty universities and fifteen cities have placed restriction on their Sudan-linked investments.

The University distributed letters to all of its investment managers advising of the Sudan Divestment initiative which states if the University has a direct holding in a company on the Task Force's list of "highest offenders" the University would undertake "shareholder engagement" with the scrutinized company informing the company that it is a candidate for divestment if it does not improve its actions relative to the tragic situation in Sudan. If at the end of the shareholder engagement period the University determines the company remains on the Task Force's "highest offenders" list, the University will divest its holding in the company.

## Administration & Finance

## Subcategory IV. Planning

**Building, Construction, Renovation, and Land Use Plan (AF 7)**

***Rationale***

Beginning in 1993, the University of Denver decided to make a substantial investment in its Facilities with the goal to craft buildings so they could be relied upon to serve for centuries. This commitment was partially based on the observation that many of the structures built on the campus since WWII were demanding significant investments in terms of maintenance, and that in enough cases this was directly related to selection of materials and systems based on lowest first cost. The first projects were built guided by the premise that the University will use this place for centuries, and that while a particular building's program will evolve over time, it structural and weather protecting components should be selected with the intention of minimizing long-term maintenance costs. Load bearing masonry and pitched copper roofs were selected primarily for their ability to resist weathering. A further standard was (and is) set that rooms that would be occupied for more than 20 minutes/day on average would have at the minimum access to natural light and wherever possible, operable windows for natural ventilation. Careful attention to context both built (scale, & detail) and natural (solar orientation) are required.

Along with building construction, projects are required to contribute to the larger campus context by investing in such ways as being additive to the campus arboretum's breadth of plant materials, emphasis and encouragement of pedestrian ways, efficient campus utility delivery, and regional water quality and detention facilities.

The gradual development of these standards project by project reached a point of coalescence with the construction of the Ricketson law Building in 2002. A member of the Law School Faculty introduced the formal process of "green" design by advocating for the inclusion of LEED consultant to design and construction team. The result was the Sturm College of Law's building was awarded the first LEED Gold Certification in the state of Colorado and it has led to the Board endorsed policy of designing to typically a LEED Silver Level of certification for all construction on campus.

**MASTERPLAN**

In 2002 the University of Denver, in concert with our local neighborhood associations and representatives of the Building Department of the City and County of Denver, developed a Land Use plan to guide the planning for the University's University Park Campus. This plan included advocacy for durable construction, delineation of the extent of growth in both terms of enrollment and property extent of the institution over a twenty year period, and a pledge of continued an open planning process with the local

community. In 2007 the plan was updated. This Board of Trustees approved update included a Sustainability Statement that includes a statement that the University will pursue at least a LEED Silver level of certification for its projects.

***Strategies***

The University of Denver takes very seriously its responsibility to serve as a vital steward of its campus environment. A significant role of a University is to be a repository for the knowledge of prior generations to the benefit of future generations. This premise aligns well with the basis of the movement towards sustainability; meeting the needs of the present, without compromising the ability of future generations to meet theirs. Moreover, a great University's core purpose is provide a place for the advancement of knowledge, and therefore the University of Denver pursues the research and successful implementation of ideas and practices that reduce the consumption of non-renewable resources, increase the diversity and strength of our environment, and promote a productive atmosphere for learning.

In terms of those items that are relevant to this Land Use plan, The University of Denver over the past two decades has successfully incorporated a variety of standards into it facilities and operations that have contributed towards a more sustainable environment including:

- A commitment to build in a manner which promises centuries of service by these facilities. The University seeks to use structural and exterior materials that can withstand "benign neglect".
- The selection of construction materials that serve particularly well relative to the thermal dynamics of the Denver climate as well as the continual use by tens of thousands of students, alumni, faculty, staff, and guests.
- Intensive examination of building systems (Mechanical, Plumbing, Electrical, etc.) to provide long term energy efficiency while increasing user comfort and productivity.
- Facilities standards that reduce the use of potable water, pesticides, and volatile ingredients in cleaning supplies.
- The consolidation of the University's primary educational facilities on one campus, thereby maximizing the efficient use of its land.

The following Sustainability Fundamentals are embraced by the Land Use plan. The following points are excerpted from the2007 Land Use Plan Update and after each, a few examples are given on how the University supports them:

*Continue to improve and demonstrate institutional practices that increase the sustainable use of resources.*

1. The recent success of the Ricketson Law building achieving a Gold Leadership in Energy and Environmental Design (LEED) certification has led to a policy of approaching all future University construction projects with the objective of submitting them to an independent professional review for sustainability and the goal of typically

achieving a Silver Certification for all construction on our University Park Campus. (See attached LEED Criteria Analysis for additional detail in the University current approach to construction).

2. The University will take advantage on a case-by-case basis of innovative approaches to construction that promise a critical combination of longevity, maintainability, and performance that aligns with the criteria advocated by the United States Green Building Council's LEED program. As of the writing of this update, the University is pursuing a LEED Platinum certification for is ISAID addition to Cherrington Hall. This project's scale lends itself to exploring such advanced systems as a geo-thermal field and radiant-panel heating and cooling.

3. While the University has already achieved a remarkable reduction of its reliance upon fossil fuels relative to its peers, this plan embraces research into the effective deployment of wind and solar power options to further reduce reliance upon fossil fuel sources for electrical needs.

4. The University continues to consolidate water quality and water detention features so as to remediate the environmental impacts of storm water run-off on a collected scale.

*Promote the continual improvement of the campus environment for the health and safety of the University community.*

1. Access to fresh air and natural light have proven to increase health and well-being. The architecture of the university continues to emphasize that the majority of spaces in its buildings that are regularly used have operable windows and the Land-use plan here emphasizes that buildings should be sited in such manner as to take advantage of views and natural air circulation patterns.

2. The Land-use plan advocates the reduction of the number of small surface parking lots by consolidating parking to strategically located structured facilities to both increase the amount of green space on campus, and curtail convenience short trip driving within the campus.

3. The plan provides a framework for increasing the ease of navigating campus access and the variety of alternate transportation options. The plan encourages the continued development of the University's shuttle bus program, it advocates strengthening the pedestrian linkages to the recently completed RTD University of Denver Light Rail Station, and it highlights the importance of developing the Promenade concept so as to provide efficient and attractive bicycle and pedestrian movement across the campus.

*Enhance both the vitality and educational qualities of the University's ecological environment.*

1. The plan highlights the need for a variety of exterior spaces to encourage opportunities for learning between classes. Such spaces thrive on the vigor of the

plantings that define them and therefore require careful attention to the quality of soils, irrigation, and species selection relative to the particular micro-climates involved.

2. Parallel to the this plan, the University's Alter Arboretum has pursued investment in the variety of tree species on the campus both to enhance the biological sciences learning environment, as well as to research how tree species adapt to the Denver climate. The tree identification and elaboration of the Arboretums self-guided tours provide opportunities for reinforcement of the value of a life-long commitment to the environment.

*The expansion of Sustainability Principles throughout the campus community. As the plan touches upon such diverse activities as mail distribution to food service options, the Land Use plan is a significant component to reinforce the integration and foster the development of sustainability within the broader context of the campus.*

1. The plan supports the goal of approaching food service on a campus wide scale.
2. The plan encourages campus wide trash and recycling programming in coordination with both the Facilities Department and student led organizations.

The above comprises only a portion of how the Land Use plan supports the over arching goal of the University to continually improve its stewardship of our environment. The University of Denver is committed to foster the development and demonstration of effective measures to promote the sustainable use of our resources as part of its educational mission.

With over three and half million gross square feet of structures built since the 1890s, serving over 12,000 students, faculty, and staff, the University of Denver has a wide range of projects and project types. While the above clearly applies to new construction, the University applies the same standards to renovation, restoration, and interiors projects. The University recognizes that one of the most sustainable practices it can follow is to avoid demolishing existing structures that can continue to effectively serve with less consumptive renovation projects. Vital recent examples include the renovation of a 1949 Student Apartment Building to serve the Graduate School of Social Work and the renovation of our oldest building to serve for admissions.

## CONCLUSION

The 2008-2009 Sustainability Plan and Report represents the great collective effort of the University of Denver's adaptation toward becoming a sustainable institution. The process of auditing the institution and planning strategically for sustainability in the university has helped identify a number of key areas of success as well as opportunity. Current areas identified in which the university does not have any current sustainability practices in place, but is working to identify strategies and approaches include:

- A sustainability literacy assessment
- A vendor code of conduct
- Environmentally preferable furniture purchasing.

The University continues to make progress with ongoing initiatives to support sustainability. One current initiative is the adoption of green cleaning supplies for use by custodial staff. Two forthcoming initiatives include the advancement of a proposal for a DU community garden (see Appendix C) and the creation of a University of Denver Sustainability Tour.

To facilitate true community involvement and real organizational change on matters of sustainability, the University of Denver is committed to continuing efforts at increasing awareness of and opportunities for becoming more sustainable. In doing so, the Sustainability Plan and Report will be accompanied by a series of four educational campaigns meant to raise awareness and educate the University of Denver community on issues of sustainability. Those campaigns are:

- The Climate Change Campaign
- The Mindful Consumption Campaign
- The Livable Urban University Campaign
- The Green Education Campaign

*Climate Campaign* - Sustainability at the University of Denver must include helping reduce the dangerous concentration of greenhouse gases in the atmosphere. DU has agreed to do its part by setting and meeting its obligations under the Presidents' Climate Commitment. To be a leader in this national effort, DU must meet its green house gas emission reduction targets as quickly and cost effectively as possible. Our efforts will be founded in energy conservation and efficiency. These efforts save DU money and also effectively reduce green house gas emissions by reducing the demand for off-site energy generation, our largest source of green house gas emissions. A large part of energy conservation requires behavior modification: learning to do with we do while reducing our cabon footprint. In addition to energy conservation and efficiency, DU will plan to develop on-campus electricity generation and cogeneration capacity. This on campus generation capacity will be efficient and cost effective, but also will have a education component. DU students will develop and maintain any fuel cell cogeneration facility and any solar array. In addition, DU

may participate in a statewide research University wind power generation consortium. Final, if necessary, DU will buy carbon offset credits (verifiable and local) to offset any remaining carbon emissions. Through developing all five of these strategies DU will be well placed to respond flexibly and cost-effectively to the climate challenge as energy pricing and technology shift over the decades to come.

*Sustainable Urban Campus Campaign* - Sustainability at the University of Denver must include making effort to keep our urban campus livable for all members of the DU community, students, faculty and staff, regardless of income, race, nationality, sex, gender or sexual orientation. This only includes continuing the University's diversity efforts but also insuring the possibility of high quality urban living for all community members within a reasonable distance of the DU campus. To do this, DU must work with the City of Denver and surrounding communities to preserve and enhance affordable housing, shopping and other forms of essential infrastructure near campus. The Sustainable Urban Campus Campaign will enrich community life at DU and help us cost effectively reduce our green house gas emissions by reducing the amount of energy and time we spending commuting.

*Mindful Consumption Campaign* – The University of Denver is part of a global product consumption and waste disposal network. By understanding where what we use comes from and where our waste goes we learn something important about our place in the world. By using our purchasing power to encourage sustainable practices and by reducing our waste, we can make the world a better place and reduce our costs. With our campus wide recycling program we have made the first steps in this direction.

*Green Research and Curriculum Campaign* – The University of Denver offers an extraordinary rank of courses and research opportunities related to sustainability. As an institution of research and scholarship, we feel it is incumbent upon the organization to serve the public good by focusing our academic attention on areas of social, economic, and environmental sustainability. As a site of social replication, we aim to be an institution of higher education committed to access and equity through teaching, research, scholarship, and community engagement.

In addition to the "get caught green handed" campaign, the Sustainability Council will move forward in its work organized around these four themes to create a more sustainable University of Denver.

## APPENDIX A.

BYLAWS
of
UNIVERSITY OF DENVER
SUSTAINABILITY COUNCIL

ARTICLE I - PURPOSE AND HISTORY

On June 5, 2007 Chancellor Robert Coombe signed the American College and University Presidents Climate Commitment (ACUPCC). Under the terms of that Commitment, the University of Denver has pledged: (1) to integrate sustainability into our curriculum; (2) to complete a comprehensive inventory of all University related greenhouse gas emissions and update the inventory every other year and (3) to, within two years of signing, develop an institutional action plan for becoming climate neutral as soon as possible.

As the American College and University Presidents Climate Commitment states:

> We believe colleges and universities must exercise leadership in their communities and throughout society by modeling ways to minimize global warming emissions, and by providing the knowledge and the educated graduates to achieve climate neutrality. Campuses that address the climate challenge by reducing global warming emissions and by integrating sustainability into their curriculum will better serve their students and meet their social mandate to help create a thriving, ethical and civil society.

As a first step toward meeting our commitments, the Provost created a University-wide "Sustainability Council." This Council will advise the University Administration and monitor DU's progress toward meeting the goals of ACUPCC.

**ARTICLE II - MEMBERSHIP**

To provide representation across the University Community while drawing on the University Community's expertise and practical knowledge the DU Sustainability Council will include:

A representative from the University Facilities Office,

A representative from the University Architect

A representative from University Communications

A representative from the University Budget Office

Up to five members of the University staff

Up to five members of the University faculty, and

Up to five University students (Graduate and Undergraduate).

The Provost, Vice-Chancellor for Financial Affairs and the Vice-Provost for Graduate Studies and Research will be non-voting members of the Council.

Representatives from the University Facilities Office, University Architect, University Communications, and the University Budget Office will serve two year terms. These representatives may serve sequential terms if designated by the entities they represent.

Generally, staff and faculty representatives will serve two year terms. Initially, five of the ten faculty and staff representatives will serve for a single year. Therefore, after May 2009, five new faculty and staff representatives will be chosen every year.

Each May beginning in 2009, the Provost office will announce the annual selection process for the faculty and staff positions. Applications will be submitted to the Council and the Council (including departing members) will choose five new members by majority vote.

To be eligible for service on the Council, faculty and staff members must have worked at the University of Denver for a full calendar year before their selection to the council.

Unless the Council itself wishes to limit the length of service, representatives may serve sequential terms.

To be eligible for service on the Council, student members must have been enrolled at the University of Denver for six months before their selection.

Generally, student representatives may serve as long as they are enrolled at DU. However, student representatives are not rendered ineligible for service if they are not enrolled during a single academic quarter or a single academic semester.

Absent extraordinary circumstances, student representatives should commit to serve on the council until the annual May Council member selection process. If they wish to end their service, they should notify the Council at least one month before the annual selection process takes place. The Provost's office will then announce the availability of student positions on the Council. Applications will be submitted to the Council. The student members of the council (including departing student members) will choose the necessary number of new student members by majority vote.

**ARTICLE III - OFFICERS**

Officers of the Council shall include a Council Chair, various committee chairs (as designated by the Council Chair and Council), a Secretary and a Webmaster. The officers of the Council shall be elected, each May, for one year terms by majority vote of the Council. Officers will be selected annually or as vacancies occur. Officers may serve sequential terms, if reelected by a two-thirds vote.

A. The **COUNCIL CHAIR** shall:

1. prepare an agenda for each meeting.
2. preside at all meetings and enforce all policies established by the Council,
3. appoint subcommittees subject to approval by the Council,
4. call meetings for the Council and notify all Council members in advance,
5. approve all communications on behalf of the Council,
6. speak for the Council or designate another member of the Council to speak for the Council,
7. prepare an annual budget request (if necessary) for Council's approval and submission to the Vice Chancellor for Financial Affairs,
8. delegate duties to Council members as appropriate.

B. The **SECRETARY** shall:

1. record the minutes of all Council meetings,
2. maintain minutes in a permanent book to be passed on to the succeeding secretary,
3. distribute copies of the minutes electronically one week following the meeting; distribute agendas electronically one week prior to meetings,
4. keep a record of attendance of members, excused and unexcused absences, and keep the Council Chair informed of these absences, and,
5. Maintain a compendium of all documents generated or collected as part of the Council's work.

C. The **WEBMASTER** shall:

1. design and maintain a Sustainability Council web site in keeping with the format established by the University of Denver Webmaster.
2. keep all information current by performing updates in a timely manner.

**ARTICLE IV - MEETINGS**

Meetings shall be held on the first Friday of each month of the calendar year unless otherwise changed by the Council. Regular meeting times will be established annually and will not vary absent extraordinary circumstances.

Meetings of the full Council will be limited to one and one-half hours in length
Special meetings may be called by the Council Chair, upon request of Council members or the University Administration.

All faculty, students and staff of the University are welcome to attend regular or special Sustainability Council meetings and are encouraged to do so. Council meetings shall proceed from an agenda, and non-Council members wishing to address items on the agenda must inform the Council Chair in advance of the meeting. Only members of the Council have voting privileges.

Committee recommendations, resolutions and other action items shall be approved by the Council by majority vote of the Council members in attendance.

A majority of the total membership of the Council (excluding vacant positions), shall constitute a quorum for the transaction of business at any meeting of the Council.

**ARTICLE V - COMMITTEES**

The formation of a committee shall be approved by a majority vote of the Council. Each committee shall have a specific task or objective. Each committee will have a specific term and, absent action by the Council, will cease to exist at the end of that term. Committees shall act as forums for the gathering of information, study and consideration of issues and activities and shall make recommendations to the Council. All proposals and recommendations of committees shall be made to the Council at the monthly meeting and approved by a majority Council vote.

Members of a committee may consist of both members and non-members of the Council who are faculty students and staff of the University of Denver. Membership on a committee will be on a volunteer basis. All committee members must indicate their willingness to serve to the Chair of the committee. Each designated committee chair shall be responsible for maintaining a list of current committee members and notifying the Council Chair and Council members of committee membership.

A list of Sustainability Council committees, their tasks and objectives, their membership and their terms shall be posted by the Council Webmaster on a Sustainability Council web site. Each committee member is responsible to attend meetings as scheduled by the committee chair. If a member does not attend three or more consecutive meetings, the committee shall assume the member has relinquished his position on the committee. Each committee shall have a chair who will be responsible for the budgetary, administrative and project coordination of all committee functions. The committee chair will also preside over all committee meetings and be responsible for the general report-out of committee activities to the Council at the monthly Council meeting. The committee chair shall initially be appointed by the Council Chair and subsequently be elected by the committee members.

**ARTICLE VI – VOTING**

The Council and its committees shall strive whenever possible to make decisions openly and by consensus. However, whenever any issue before the Council or one of its committees appears contentious, the Council Chair, committee chair or any two voting members of the Council or committee may request a secret ballot. Secret ballots will take place immediately, during Council or committee meetings by circulation of paper ballots. Votes will be tabulated by committee chairs for secret ballots taken during committee meetings and by the Council Secretary for secret ballots taken during Council meetings.

**ARTICLE VII - AMENDMENTS TO BYLAWS**

An amendment to the Bylaws may be proposed by the Council members in writing to the Council Chair two weeks prior to a regularly scheduled meeting. After review by the Council, the proposed amendment must receive an affirmative vote of two-thirds of the Council members responding and shall not thereafter become effective until approval by

University Counsel as being consistent with established University policies and procedures.

## Appendix B.

## DU Recycling Proposal- April 17, 2008

The American College and University Presidents Climate Commitment recommends many 'Tangible Actions' that can be taken to reduce greenhouse gas emissions resulting from current campus practices. One of these 'actions' is to develop a 'Waste Minimization' program.[1] To achieve this, the PCC recommends that institutions participate in the national Recyclemania[2] competition. Recyclemania is a friendly competition between over 200 colleges and universities around the country whereby the institutions respective recycling programs go head to head in one of four competitions, all the while raising awareness of and excitement for recycling. The competition choices are: the largest amount of recyclables per capita, the largest amount of total recyclables, the least amount of trash per capita, or the highest recycling rate. DU would register in the fall of 2008 or very early in 2009 for the spring 2009 competition, and can prepare the campus for the event during this time. The success in the Fall of 2008 of an implemented program at DU would be grounds for deciding which competition would best suit the University.

In addition to Recyclemania, the PCC recommends 'adopting at least three or more associated measures to reduce waste' such as:

- establishing a campus recycling program;
- incorporating materials management information into new employee and/or new student orientation programs;
- creating and promoting a system for the campus community to report wasteful practices and offer suggestions for waste reduction.

There are many additional measures that are recommended (see footnote # 1), however the focus of this proposal is on achieving the bullet points listed above. It should be noted that although DU does in fact currently have a recycling program, it has been deemed inadequate and therefore this proposal considers an entirely new system in its place.

The proposed project for the University of Denver is to expand an existing recycling program, recently established at the Daniels College of Business, across all departments, facilities, and residence halls throughout the DU campus. The program at Daniels reduced the average amount of waste produced from that building by 50%. The success of this program is attributed to: a substantial increase in the number of recycling bins; using a single stream (co-mingled) system; and a supportive educational campaign.

The current recycling rate for the DU campus is about 8%, which equates to 10.5 tons per month. We estimate that emulating the prototype system established at Daniels throughout the University will increase the campus wide recycling rate to possibly 30%, or 40 tons per month. This will result in a massive reduction in the amount of waste

[1] See the President's Climate Commitment's *Implementation Guide: Information and Resources for Participating Institutions (September 2007)* at: http://www.presidentsclimatecommitment.org/pdf/ACUPCC_IG_Final.pdf
[2] http://www.recyclemaniacs.org/Index.htm

going to the local landfill, and will significantly reduce the greenhouse gas emissions produced by the campus.

**A Closer Look**

Each month, the University of Denver produces approximately 120 tons of waste, and 10.5 tons of recycling. The single stream recycling system at Daniels accounts for 40% (4.2 tons) of the total campus recycling. Yet, it is estimated that Daniels only contributes about 5% to the total campus waste. This significant discrepancy of Daniels being the greatest contributor to the overall recycling output, but only a minor contributor to the waste production highlights both the strength of recycling program at Daniels, and more so, the glaring weakness in the campus wide (excluding Daniels) recycling program. Daniels aside, the remaining 6.3 tons of monthly recycling on campus is dual stream; with an estimated 5.5 tons attributed to paper, and less than a ton from plastics, glass, and aluminum.

The infrastructure for this project would be put in place during the summer months, while the majority of students are not on campus. In a relatively short period of time we could have over 2000 recycling bins distributed strategically throughout campus, along with informational flyers above or on the actual bins. The system would be in place by the end of August, and ready for the arrival of students for the fall quarter in September, 2008. The benefits of this system would be immediate, and sustained into the foreseeable future.

As mentioned above, there are three main elements for successful implementation of this program:

- a substantial increase in the number of recycling bins;
- using a single stream (co-mingled) system; and
- a supportive educational campaign

***Recycling bins and collection***

At Daniels, the goal was to place a recycling bin of equal or larger size next to every trash can within the building. The idea is that there should always be as easy an option to recycle something as there is to trash it. This has proven to be an effective standard at Daniels and we propose the same tactic for the campus wide program. Alfredo Abad, the DU Custodial Director, estimates that there are approximately 2,523 trash cans that would need to be matched with corresponding recycling bins. Broken down, this includes 2,103 office-sized bins and 420 classroom/hallway sized bins. This number does not include those required for residence halls and Greek housing, which are in the process of being calculated.

To promote efficiency and participation, office-sized bins should be emptied at central larger recycling bin locations. This dramatically reduces the time that DU staff will have to allocate for the collection process, and also pushes the faculty and staff to participate more actively in the program, thereby raising their own awareness and buy-in to the program.

### *Single-stream recycling*

The single-stream recycling system at Daniels allows for each recycling bin to accept co-mingled materials, such as paper, glass, aluminum, plastics, junk mail, and cardboard. The convenience factor for this approach significantly increases the quantity of recycling. Further, it also provides for a more simple collection process, and reduces the transportation costs/emissions of collecting different types of materials separately. It should be noted that some controversy has arisen in the past over the contamination issues that increase with single-stream recycling. However, improved technology at the recycling facilities and a consistent supportive awareness campaign at the point of recycling have evolved as effective solutions in outweighing this controversy. Therefore, we propose implementing the single-stream program across campus. Currently, the DU campus (aside from Daniels) uses a dual stream program that requires paper to be separated from plastics, glass, and aluminum. The sparse and inconsistent locations of these various bins are inconvenient for would-be-recyclers and therefore reduces the quantity of recycling for the campus. Further, cardboard, a significant waste product for DU, is only recycled at designated areas and during seasonally high times, such as early Fall when there is a high influx of books delivered to the DU Bookstore.

Daniels currently uses Alpine Waste for their recycling program. The good relations developed with this group make them the recommended company for the campus wide program. Further, a tour was conducted on Alpine's very new recycling facilities and those on the tour were more than satisfied with the company and their processes.

### *Supportive educational campaign*

Having a supportive awareness campaign is a key to successfully implementing the proposed recycling program at DU. At Daniels, this campaign included email blasts to students, faculty, and staff, as well as flyers which were either hung above each recycling bins and/or placed on the recycling bin in sticker form. There were also presentations given in classrooms, as well as during orientation programs. The awareness raised through these efforts not only reduces the amount of contamination of the recycling bins, but also places credibility and ownership on the individuals using those bins. To expand the program campus wide, a similar all-encompassing awareness campaign must be included. Daniels is willing to share their marketing strategies for this cause. This includes the catchy phrase, 'Get Caught Green Handed', along with a painted green hand logo. Much of this awareness campaign can be organized through an elaborate model set up by Karl French for the DU Coat Drive. In addition, Recyclemania offers numerous resources that can aid in this campaign.

It is essential that incoming students, faculty, and staff are informed of the program and how it works. This should include standard information packets/flyers for faculty and staff, and presentations/displays for incoming graduate and undergraduate students. The undergraduate orientation in particular, offers unique outreach opportunities through the dormitory resident assistants, as well as the Discoveries Program.

In addition to informing incoming students and personnel on the recycling program, maintaining awareness throughout the school quarters is extremely important. Not only should flyers etc be visible, but regular (quarterly) update emails would be sent to all students, faculty, and staff. These informative blasts should include updates on the program; stats on quantity recycled etc; as well as open up channels for feedback on the program. This will allow the system to constantly be self-improving and therefore be as efficient as possible.

## Summary

Completely overhauling the current recycling program at DU will be a significant step towards meeting the requirements of the Presidents Climate Commitment. In addition to the logistical details and promotional tactics of running the program, openness and availability to public input will make for a constantly improving program.

A revitalized recycling program not only will reduce DU's emissions, but will also act as a signal to the community as well as PCC that sustainability is being taken seriously on campus. The tangible action will have immediate positive effects on the state of conscious for the DU community. It represents the most visible evidence of DU's intention to reduce their environmental impact. Lastly, it creates a legacy of awareness for all DU community members that recycling should be an expectation as they move on to their respective endeavors.

As added support for this cause, we are in the midst of conducting a campus wide petition to highlight both the need and desire by the DU community to have a much improved recycling program in place.

## Costs

The cost for implementing the proposed recycling system at Daniels are broken down for the first year in the below chart.

| **Costs** | | |
|---|---|---|
| | | |
| **Truck with lift** | **$25,000** | |
| **Salaries x2** | **$62,000** | **Two Full Time employees (includes benefits)** |
| **Recycling Bins** | **$25,000** | |
| **Marketing** | **$5,000** | **Creation of flyers/stickers/posters etc** |
| | | |
| **Total** | **$117,000** | |

Notes:

- The truck, recycling bins, and majority of the marketing costs are one-time initial purchases that do not represent future expenses after the program is in place.
- The costs for the recycling bins are pending existing number of bins as well as the number needed to support residence halls and Greek housing.
- The marketing costs is a very rough estimate and is considered highly inflated as a safety.
- The salaries for each employee ($31,000) includes both the full time wage of $11.67/hour, as well as benefits.

## Appendix C.

## Proposal for a campus community garden and permaculture garden

Our success in achieving environmental sustainability at DU is multiplied a hundredfold if we plant the desire and know-how for sustainable living with the student population that passes through. Toward this end, the undersigned are proposing the creation of two demonstration gardens dedicated to local food production—a "community garden" focusing on annual vegetable production; and a "permaculture food forest" (described in more detail below), focusing on perennial fruit and vegetable production. They are to demonstrate just how much can be done in the way of local food production at the scale of the typical suburban yard.

**Why local food production?**

The major source of wildlife habitat destruction and land degradation is actually not the spread of human habitation, but of human agriculture. 6% of American land is occupied by our towns and roadways; between 40% and 70% of the land (estimates vary) is used for food production. To the extent that we use our own backyards as a source of food, using intensive, organic rather than extensive, industrial principles, we

- limit the destruction and degradation of natural ecosystems;
- reduce the amount of fossil fuel used to generate synthetic fertilizer (an energy intensive process) and to transport food across the country;
- improve the quality of our diet, since both the taste and nutrient content of garden produce is far superior to those grown in synthetically fertilized, chemically-sprayed, industrially bred monocultures.

***The Community Garden***

The community garden concept is a familiar one. Our proposed garden, although largely conforming to type, is envisioned as having a more educational purpose than a standard community garden, in that it would be managed so as to encourage best-practices, such as mulching, composting, use of nitrogen-fixing and soil-building plants, companion planting (species that do best planted next to one another), and use of natural alternatives to chemical insecticides, including beneficial insect attractors and harmful insect repellers. Adoption of some of these practices would be a condition of receiving a plot; others would be encouraged through permanent informational placards and occasional workshops.

*Use:* We believe the plots in the garden should serve members of the neighborhood as well as members of the campus community (faculty, staff, and students), with roughly 50% of the plots reserved for each group. We see inclusion of our neighbors as in line with the university's Public Good commitment, as well as providing an opportunity for town and gown to get to know each other on friendly terms. We also see the garden as an excellent site for students to undertake service learning projects. For example, students might maintain the garden's common areas (pathways, garden walls, composting stations, and so forth); work up informational placards on best-practices; and run workshops on advanced gardening practices (vermicomposting, composting-in-place, companion planting, and suchlike).

*Oversight:* We are proposing that both gardens be placed under the oversight of a new "Garden Subcommittee" of the Sustainability Council (probably under Reduce, Reuse, Recycle). This Subcommittee would have little to do with regard to the Community Garden, because of the management structure described below. It would mainly serve to give some very general direction to the garden's evolution, and serve as a final authority in the face of any intractable managerial disagreement or breakdown. While bookkeeping should be a function of the management team, for oversight purposes review of the books and payment of all bills should be the responsibility of the Garden Subcommittee.

*Management:* Drawing on the experience of Denver Urban Gardens, we propose the formation of a small management team composed of university and neighborhood volunteers. Involvement of neighborhood leaders at this level is key to the good functioning of the garden, especially during the crucial summer months. Tasks of the management team will include garden planning, the assignment of plots, and the resolution of disputes between individual gardeners.

*Maintenance:* Individual plots would be maintained by the gardeners themselves. Common spaces and infrastructure would be maintained through a variety of means: student service learning projects; monthly work days for the gardeners (especially important during the summer months); and volunteer days by campus and neighborhood groups—both as a way to get the work done, but more importantly as a way to raise awareness of the garden and its work. This last device has proven highly effective at [university name].

***The Permaculture Garden***

"Permaculture" is a contraction of "permanent agriculture." As this suggests, these gardens focus on food producing *perennials*, and in their full glory become "food forests."

As a gardening principle, permaculture aims for intensive food production with minimal human inputs (whether in the form of labor or materials), because plants are selected that do most of the work for us.

*Two examples:*

Permaculture gardens are generally organized as clusters of *plant guilds*—plants that work together to benefit one another. The classic food producing guild is the *three sisters* of corn, beans, and squash—the corn serves as a trellis for the beans, the beans, which are a nitrogen fixer, fertilize the corn and squash, and the squash, with its broad leaves, serves as a living mulch for all three, conserving water by shading the soil.

In a permaculture garden that aspires to become a food forest, guilds center on a fruiting tree—say, an apple tree. Around this we construct the guild. Since the roots of grasses compete with apple trees for water and nutrients, we plant under the tree some early *grass suppressing bulbs*—something like daffodils for aesthetics, or perennial garlic for food. Additionally, we plant perennial, edible *mulch plants*, such a rhubarb or

comfrey. This reduces or eliminates the need for hauling in mulch and provides further food. Mixed in with these, one plants *nitrogen fixers*—say, clover or cowpeas—and *nutrient accumulators*, such as yarrow or plantain, that pull up minerals from deep in the ground and make them accessible to the other plants. Between the nitrogen fixers and the nutrient accumulators, we've eliminated the need for yearly applications of compost and all the work that comes with composting. Into this mix one further plants *pest repellants*, such as nasturtiums, and *beneficial insect attractors*, such as bee balm. One may also c*ompanion plant*. For example, for reasons somewhat mysterious, raspberries and apples do well together, and since raspberries appreciate some shade, they can be planted on the edges of the tree canopy. Other food producers could also be introduced, such as a fruiting vine to climb the tree trunk, or gooseberries and currents, which fruit even in partial shade. Finally, one introduces a habitat nook, such as a little pile of rocks, or dish of water, for beneficial animals such as snakes and birds. This rounds out our plant guild.

Next to this guild one plants another guild, say a mulberry tree guild, since mulberries and apples do well together, and a walnut tree guild next to that, since mulberries are not affected by the soil toxin that walnuts generate. The end result is an attractive, low-maintenance, high yield, edible landscape that, as it matures, becomes a veritable food forest.

*Use:* Such gardens are neither capital intensive nor labor intensive; but they *are* knowledge intensive, which makes them excellent educational sites. The first use of the permaculture garden is for hands-on classroom instruction. The Environmental Awareness Living and Learning Community, the Environmental Science Department, and the multi-disciplinary faculty associated with the Sustainability Service Learning POD, have all expressed interest in using the site for this purpose, and this list will doubtless expand. The garden could also be used for public workshops open to both town and gown. The second use of the garden is as a research project generator. For example, as alluded to above, there are many symbiotic relationships between species of plants that we really don't understand. The role of soil mycelium (fungus filaments) in successful plant guilds remains uncertain. The comparative economics of permaculture and industrial food production remains to be worked out. While the Permaculture Garden may not be a suitable site for conducting controlled agricultural experiments, it could inspire many kinds of research projects, to be pursued in more controlled research conditions. As a third use, we would aspire to supply some produce to the campus cafeterias. In particular, we believe that apples could be provided in quantity, with flavor, variety, and nutritional value far superior to current cafeteria fare. (Should this trial successfully, the practice could be extended through a "distributed orchard," with one or two apple trees of good-keeping varieties planted in various nooks around campus.) Produce coming in when school is out of session could be donated to a local food pantry.

Finally, it should be noted that the permaculture garden could be readily expanded to include other sustainability components. For example, cob, which is a kind of adobe material that is applied wet, is a low-cost green building material, and could be used to fashion garden walls, protecting the garden from high winds and cold. One might be

able to make use of runoff from a nearby roof, providing an opportunity to teach about wise water usage. And so forth.

*Oversight and Management:* Again, we believe this garden should be under the auspices of a garden subcommittee of the Sustainability Council. In the case of the permaculture garden, this subcommittee will act as the main steering committee, with planning and managerial responsibilities. Since the permaculture garden will be its primary focus, this subcommittee would best include a representative from each of the major groups using the garden. Its main initial task would be to draw up a master plan for the site. Subsequent managerial tasks would be divided up among members. A single person may be designated operations manager. This person might keep up a website noting needed garden work, and would be the person to contact for any interested group that wants to do work at the site, who will make sure that the proposed work is consistent with the master plan and does not conflict with another scheduled class.

*Maintenance:* maintenance of a permaculture garden, once established, is quite minimal. Mostly, it is just a matter of harvesting! The initial work of plant selection, planting, mulching, and so forth, would be done by classes and involved student groups, as would subsequent upkeep.

**Siting considerations**

The siting of these gardens must weigh several factors. Of the first importance is the selection of sites that can be dedicated to these gardens for the long term. Community gardeners work laboriously over several years to build up the soil in their individual plots. Furthermore, such gardens become the focal point of social networks that overflow the bare activity of gardening. To lose a garden is to lose precious social capital built up over years. A permaculture food forest requires even longer to come into its own. Fruit trees—the anchors of such gardens—take several years to come into production, and many nut trees don't start producing until they are around ten years of age. Accordingly, we consider ten years the minimum time commitment we would entertain for a permaculture garden.

Aesthetics must also be given its due. It is recognized that a tidy, attractive landscape is appealing to parents who visit campus. Permaculture gardens in particular grow up to be colorful, inviting landscapes. However, because all gardens in the early years have a "work-in-progress" look about them, we are cognizant that it may be best to keep them out of the central vistas of the campus. At the same time, we believe it would be best were they sited where there is reasonable student foot-traffic, so that they can better serve their educational purpose. With the assistance of Mark Rodgers, the campus architect, and Dave Synder and Allan Wilson, of Facilities Management, we have identified a couple of sites that do a reasonable job of striking this balance.

**Proposed sites**

For the Community Garden, we propose using the vacant lot at 1819 S. High Street, just North of Centennial Halls. It is currently zoned R2, but Allan Wilson doesn't expect

difficulty in getting it rezoned for a garden. Wilson has also expressed his willingness to set up a small retaining wall toward the back of the lot, to maximize the usable garden space, and to irrigate the lot from the existing water head. Although exact measurements have yet to be taken, we believe this lot could accommodate roughly twenty 10' x 12' garden plots, leaving ample room for pathways and common space.

For the Permaculture Garden, we have been looking at spaces on the Southwest corner of campus, in order to be near two groups that have expressed strong interest in tending the garden and using it for educational purposes: the students in the Environmental Awareness Living and Learning Community, all of whom live in Johnson-McFarland, and the faculty of the Department of Geography and the Environmental Sciences Program, housed in Boettcher West. An initial suggestion for using the vacant lot at the 1300 block of Race has been giving way to a proposal for using the sloped green space which runs along the West side of Boettcher and hooks around to the South, forming an "L." One drawback of the vacant lot is the long-standing idea (though never executed and currently quiescent) to use the lot for expanded visitor parking. Another negative is that there is no water head on the lot. While permaculture gardens are low-water affairs, occasional watering may be necessary during summer droughts, and dragging a hose across the alley would not be a very efficient way of accomplishing this. In contrast, the land abutting Boettcher is irrigated, has no designs upon it, and because it is sloped, is currently an entirely unutilized space. (A slope is not problem for a permaculture garden, and even has advantages in terms of using gravity to direct water flows.) Its total square footage is somewhat greater than the lot.

**Budget**

A successful garden is more a matter of intelligent labor than of large capital input. The largest expense would be in the early years, for soil amendments, plants, and perhaps some landscape rock. We believe we can safely count on five thousand dollars in start-up money from the Sustainability Committee of the Undergraduate Senate, and possibly several thousand more in support from the Public Good fund of the Office of Community Engagement and Service Learning. If Grounds would be willing to undertake some minor earth moving (and they have expressed willingness), we believe these monies will be sufficient to establish both gardens without support from the general University budget. Given that maintenance will be done by students and other involved parties, budgets beyond the first year should be very modest.

# Appendix D.

## LEED Tally Sheet

TALLY OF LEED's POINTS

| | | RUFFATTO HALL | ISAID/PARDEE | NAGEL HALL, POTENTIAL | RICKETSON, NEW BUILDING | CRAIG HALL, RENO/ADDITION | KAPPA SIGMA, SM. RESIDENCE | BARTON LACROSSE STADIUM | HRTM, NEW (KITCHENS) |
|---|---|---|---|---|---|---|---|---|---|
| **SUSTAINABLE SITES** | | | | | | | | | |
| Erosion | SSp1 | R | R | R | 1 | 1 | 1 | 1 | 1 |
| Site Selection | SSc1 | 1 | 1 | 1 | | | | | |
| Development Density & Community Connectivity | SSc2 | 1 | 1 | 1 | | ? | | | ? |
| Brown Field Redevelopment | SSc3 | | | | | | | | |
| Alternative Transportation, Public Transportation Access | SSc4.1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Alternative Transportation, Bicycle Storage & Changing Rooms | SSc4.2 | 1 | ? | 1 | 1 | 1 | 1 | 1 | 1 |
| Alternative Transportation, Alternative Fuel Vehicles | SSc4.3 | 1 | 1 | 1 | 1 | ? | ? | | ? |
| Alternative Transportation, Parking Capacity | SSc4.4 | 1 | 1 | 1 | 1 | ? | ? | | ? |
| Reduced Site Disturbance, Protect or Restore Open Space | SSc5.1 | | 1 | | | | | ? | 1 |
| Reduced Site Disturbance, Development Footprint | SSc5.2 | 1 | 1 | 1 | | 1 | 1 | ? | ? |
| Stormwater Management, Rate & Quantity | SSc6.1 | 1 | 1 | | | ? | ? | ? | ? |
| Stormwater Management, Quality Treatment | SSc6.2 | 1 | ? | | 1 | 1 | 1 | ? | 1 |
| Heat Island Effect, Non-Roof | SSc7.1 | ? | 1 | ? | 1 | 1 | 1 | ? | 1 |
| Heat Island Effect, Roof | SSc7.2 | | ? | | | | | | |
| Light Pollution Reduction | SSc8 | 1 | 1 | | 1 | 1 | 1 | field lights | 1 |
| **WATER EFFICIENCY** | | | | | | | | | |
| Water Efficient Landscaping, Reduce by 50% | WEc1.1 | | ? | | 1 | 1 | 1 | 1 | 1 |
| Water Efficient Landscaping, No Potable or No Irrigation | WEc1.2 | | ? | | 1 | ? | ? | 1 | ? |
| Innovative Wastewater techniques | WEc2 | | | | | | | | |
| Water Use Reduction, 20% Reduction | WEc3.1 | 1 | 1 | 1 | 1 | ? | 1 | 1 | ? |
| Water Use Reduction, 30% Reduction | WEc3.2 | ? | ? | 1 | 1 | ? | 1 | 1 | ? |
| **ENERGY & ATMOSPHERE** | | | | | | | | | |
| Fundamental Building Systems Commissioning | EAp1 | Y | Y | Y | Y | Y | Y | Y | Y |
| Minimum Energy Performance | EAp2 | Y | Y | Y | Y | Y | Y | Y | Y |
| CFC Reduction in HVAC&R Equipment | EAp3 | Y | Y | Y | Y | Y | Y | Y | Y |
| Optimize Energy Performance, 14% New/ 7% Existing | EAc1.1 | 1 | 2 | 1 | 2 | 2 | 2 | 2 | 2 |
| Optimize Energy Performance, 10.5% New/ 3.5% Existing | EAc1.2 | 1 | | 1 | | | | | |
| Optimize Energy Performance, 17.5% New/ 10.5% Existing | EAc1.3 | 1 | 2 | 1 | 2 | ? | ? | ? | ? |
| Optimize Energy Performance, 21% New/ 14% Existing | EAc1.4 | 1 | | 1 | | | | | |
| Optimize Energy Performance, 24.5% New/ 17.5% Existing | EAc1.5 | 1 | ? | 1 | 2 | ? | ? | ? | ? |
| Optimize Energy Performance, 28% New/ 21% Existing | EAc1.6 | 1 | | 1 | | | | | |
| Optimize Energy Performance, 31.5% New/ 24.5% Existing | EAc1.7 | ? | ? | ? | | | | | |
| Optimize Energy Performance, 35% New/ 28% Existing | EAc1.8 | | | | | | | | |
| Optimize Energy Performance, 38.5% New/ 31.5% Existing | EAc1.9 | | | | | | | | |
| Optimize Energy Performance, 42% New/ 35% Existing | EAc1.10 | | | | | | | | |
| Renewable Energy, 2.5% | EAc2.1 | ? | 1 | | | ? | | ? | ? |
| Renewable Energy, 7.5% | EAc2.2 | | 1 | | | ? | | ? | ? |
| Renewable Energy, 12.5% | EAc2.3 | | 1 | | | | | | |
| Enhanced Commissioning | EAc3 | 1 | ? | 1 | 1 | 1 | 1 | 1 | 1 |
| Enhanced Refrigerant Management, Ozone Protection | EAc4 | 1 | 1 | | | | ? | | ? |
| Measurement & Verification | EAc5 | ? | ? | | | | | 1 | ? |
| Green Power: 35% | EA6 | ? | ? | 1 | 1 | ? | ? | ? | ? |
| **MATERIALS & RESOURCES** | | | | | | | | | |
| Storage & Collection of Recyclables | MRp1 | Y | Y | Y | Y | Y | Y | Y | Y |
| Building Reuse, Maintain 75% Of Existing Walls, Floors, & Roof | MRc1.1 | | | | | 1 | | | |
| Building Reuse, Maintain 95% Of Existing Walls, Floors, & Roof | MRc1.2 | | | | | 1 | | | |
| Building Reuse, Maintain 50% non-structural | MRc1.3 | | | | | | | | |
| Construction Waste Management, Divert 50% from Landfill | MRc2.1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Construction Waste Management, Divert 75% from Landfill | MRc2.2 | ? | ? | 1 | | 1 | 1 | ? | ? |
| Resource Reuse, 5% | MRc3.1 | | | | | | ? | ? | ? |
| Resource Reuse, 10% | MRc3.2 | | | | | | | | |
| Recycled Content, 10% (post-consumer, + 1/2 post-industrial) | MRc4.1 | 1 | 1 | 1 | 1 | 1 | 1 | ? | 1 |
| Recycled Content, 20% (post-consumer, + 1/2 post-industrial) | MRc4.2 | 1 | ? | | 1 | ? | 1 | ? | ? |
| Regional Materials, 10% Extracted, Manufactured, Processed | MRc5.1 | 1 | 1 | 1 | 1 | 1 | 1 | ? | 1 |
| Regional Materials, 20% Extracted, Manufactured, Processed | MRc5.2 | ? | ? | ? | 1 | ? | 1 | ? | ? |
| Rapidly Renewable Materials, 2.5% | MRc6 | ? | ? | | | | | ? | |
| Certified Wood | MRc7 | ? | 1 | 1 | | ? | ? | ? | ? |
| **INDOOR ENVIRONMENTAL QUALITY** | | | | | | | | | |
| Minimum IAQ Management | IEQp1 | Y | Y | Y | Y | Y | Y | Y | Y |
| Environmental Tobacco Smoke (ETS) Control | IEQp2 | Y | Y | Y | Y | Y | Y | Y | Y |

# Appendix E.

University of Denver
***All Undergraduate Student Association Senate***
2008-2009

**Resolution-5B**

**Authored By:** AHUM/SOCS Senator Mary Jean O'Malley

**Sponsored By:** Off-Campus Senator Zoee Turrill, Off-Campus Senator John McMahon, Daniels College of Business Senator Jason Lundberg, First Year Senator Milan Chatterjee, Sophomore Senator Kaitlyn Barclay, Senior Senator Nick Phelps, AHUM/SOCS Senator Tess Cromer, and President Pro Tempore Javi Ogaz

**A RESOLUTION**

**Whereas,** the University of Denver is committed to sustainable development and reducing its carbon footprint; and,

**Whereas,** DU students are required to have a laptop and the campus as a whole has tremendous access to online academic tools and resources, including Blackboard; and,

**Whereas,** the campus is entered into the nationwide *RecycleMania* competition (www.recyclemaniacs.org), beginning January 18 until March 28; and,

**Whereas,** DU's registration into the competition included commitments to reduce waste (trash and recycling) across campus; and,

**Whereas,** these commitments focused on reducing paper waste on campus whenever possible, so as to compliment efforts to reduce our carbon footprint and to aid in our competition; therefore,

**Be It Resolved,** that the AUSA Senate strongly encourage University administrators, faculty, staff, and students to use electronic communication whenever possible; and,

**Be It Further Resolved**, that the AUSA Senate strongly recommend that University faculty request only electronic copies of assignments whenever possible; and,

**Be It Further Resolved**, that the AUSA Senate strongly recommend that any non-textbook course readings available online not be required to be printed for the purposes of the class, but instead can be left in electronic form; and,

**Be It Further Resolved**, that the AUSA Senate strongly recommend that when printing is required, University administrators, faculty, staff, and students print double-sided whenever possible; and,

**Be It Further Resolved**, that this resolution is forwarded to University administrators, faculty, staff, and students as soon as possible.

## Appendix F.

University of Denver
***All Undergraduate Student Association Senate***
2008-2009

**Resolution-7A**

**Authored By:** AHUM/SOCS Senator Mary Jean O'Malley and AHUM/SOCS Senator Zoee Turrill

**Sponsored By:** President Monica Kumar, Vice-President Antoine Perretta, and President Pro-Tempore Javi Ogaz

**A RESOLUTION**

**Whereas,** the AUSA Senate has confirmed the creation of a Sustainability Committee; and

**Whereas,** the AUSA Senate has confirmed the appointment of AHUM/SOCS Senator Mary Jean O'Malley as Chairperson of the committee; and

**Whereas,** the AUSA Senate has confirmed the appointment of Off-Campus Senator Zoee Turrill as Vice-Chairperson of the committee; and

**Whereas,** the chairperson and vice-chairperson have been charged to develop a constitution for the committee; therefore

**Be It Resolved,** that the AUSA Sustainability Committee Constitution (see attached) is approved by the AUSA Senate.

Senate Action: PASSED ------ _____ Date: 09/23/2008

President's Signature: _____ Date: 09/23/2008

***PASSED UNANIMOUSLY-16 AYES-0 NAYS-0 ABSTENTIONS***