



# Climate Action Plan

June 30, 2010

**University of Colorado Denver**  
Anschutz Medical Campus • Denver Campus

The development of this plan fulfills university climate action planning requirements as a signatory of the



AMERICAN COLLEGE & UNIVERSITY  
PRESIDENTS CLIMATE COMMITMENT



This version of the Climate Action Plan for the University of Colorado Denver has been in development over the past 2 years with assistance, advice and support from the following invaluable parties. Their help is greatly appreciated as we move forward to make this plan a reality and enter the next phase of responsibility to our surroundings.

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This Climate Action Plan developed by Jarrett Smith, UC Denver Sustainability Officer, with much assistance from the aforementioned.

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## Climate Action Plan

### 1.0 Introduction

The University of Colorado Denver recognizes 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.

The university must exercise leadership in Colorado and beyond by modeling ways to minimize global warming emissions, and by providing the knowledge and the educated graduates to achieve climate neutrality. By reducing global warming emissions and by further integrating sustainability into the curriculum UC Denver will better serve the students and meet their social mandate to help create a thriving, ethical and civil society. A university that exerts leadership in addressing climate change, we can stabilize and reduce long-term energy costs, attract excellent students and faculty, attract new sources of funding, and increase the support of alumni and local communities. [See: <http://www.presidentsclimatecommitment.org/about/commitment>]

The University of Colorado Denver Chancellor's Task Force on Sustainability has developed this Climate Action Plan to fulfill requirements set forth as signatories to the American College and University President's Climate Commitment (ACUPCC) and includes goals established by the State of Colorado Governor's Greening of State Government Executive Order. The plan also incorporates direction given by the University of Colorado Board of Regents' Sustainability Resolution of 2009 and the University Planning and Accreditation Committee. The University considers this plan to be a dynamic and fluid document that can and will be altered as the campuses grow, funding is made available and new technologies arrive.

UC Denver has measured its greenhouse gas (GHG) emissions, or those gases emitted that can contribute to atmospheric climate change, in accordance with the World Resources Institute (WRI) GHG Protocol for the baseline year of 2006. The comprehensive nature of this inventory has allowed for planning to focus on the greatest source of emissions, campus building energy use. It has also allowed educated assumptions to be made on campus greenhouse gas trajectories in accordance to the ten year campus master plan. All three scopes of GHG emissions have been measured and the GHG reduction strategy focuses on reducing Scopes 1 & 2, or those that the university has direct financial control over. Reductions for Scope 3 emissions are also planned to help the university achieve further overall emissions reductions.

The Climate Action Plan focuses on three phases of emissions reductions. The first phase will seek a 20% reduction by the year 2020 from the baseline year of 2006 and will focus on energy efficiency and conservation, while incorporating on-site renewable energies, purchased wind power and carbon offsets. This phase also includes requirements in resource reductions from energy, fuel, water and paper as required by the Greening of Government Executive Order. This first phase is the most vital piece of the plan as it begins to drive the university GHG trajectory downward and most decisions in developing this plan have been made with the express purpose of doing as much as possible to reduce GHG emissions over the next decade.

Future phases will focus on conglomerates and partnerships to develop expansive energy production facilities that do not emit GHGs and to adopt future technologies that may be now only in research and development stages. This will allow for a total GHG reduction that is 80% below 2006 emissions.

Financial feasibility parameters of GHG reduction projects for this plan are informed by developing internal criteria that will allow for responsible stewardship of funds and for total GHG reductions. Many criteria will be considered for each project including payback periods, lifecycle cost analysis, total GHG reductions, operating environment and immediate need. Funding for these projects will come from a myriad of sources including general fund monies, treasury bonds, utility rebates, performance contracts, a green projects revolving loan fund, and state and federal grants.

This plan integrates the academic and research environment of the university as a strategic component. Currently, at least six schools and departments within the university offer classes and research programs with components on climate science, climate planning and general sustainability issues that range from urban food deserts to net-zero-energy-use building design to local government climate policy. There are many opportunities for university administration to use these academic resources in developing climate-related projects and opportunities for students and faculty to have experiential learning opportunities in working with the university on the development of GHG reduction projects ranging from building architecture to business planning.

This version of the University of Colorado Denver Climate Action Plan may be one of many to come. As aforementioned, this plan is a dynamic and fluid document that can and will change with the number of variables that a large public institution of higher education must weigh when planning for the education of the current and future generations of students. This plan provides the framework for the university to meet GHG reduction goals, plan for superior facilities and operations and educate students, faculty and staff on the benefits of considering GHG emissions, energy and natural resource use and good stewardship of the human environment as we plan for the future.

## 2.0 Institutional Commitments and Organization

The development of this action plan coincides with four developments at UC Denver that lead to a more defined commitment to planning for climate action:

- *American College and University President's Climate Commitment (ACUPCC):* The ACUPCC is a commitment by nearly 700 colleges and universities across the nation to develop comprehensive plans and take active steps in reducing their contributions to climate change. Chancellor M. Roy Wilson signed the ACUPCC in June of 2007 and UC Denver has worked actively to fulfill the requirements set forth in the commitment. These include the formation of a sustainability and climate action committee, greenhouse gas accounting, incremental steps to reduce greenhouse gas emissions and the writing of this plan. Bi-annual updates on greenhouse gas emissions and climate action progress are also required.
- *Colorado Governor's Greening of State Government Executive Order:* Signed by Governor Bill Ritter in the 2007, this executive order requires all state agencies to reduce

their use of natural resources, including fossil fuels, by specific percentages by the year 2012. It also states that state organizations should set a goal of zero-waste in construction projects. (See Appendix A2)

- *The University of Colorado Denver Strategic Plan 2020, University Priority 7 - Secure the resources to achieve our vision while being responsible stewards of those resources.* This priority moves beyond simply seeking financial resources to maintain university purposes and ensures that UC Denver is investing in sustainable approaches to construction, operations, community building and most importantly, education. Specific objectives include:
  - **Objective 7.2.2** Implement the UC Denver facilities capital plan to provide cost-effective, adaptable, maintainable, sustainable, and accessible facilities.
  - **Objective 7.2.7** Fund leading-edge, cost-effective, and sustainable information resources and technologies to increase access and support and to advance education, research, and clinical care.
  - **Objective 7.3.4** Provide and sustain an appropriate and evolving technology infrastructure that aligns with and supports the institutional strategic plan.
- *University of Colorado Board of Regents' Sustainability Resolution:* This resolution was developed and adopted by the Regent's in October 2009 and recognizes the significant leadership roles and opportunities the University of Colorado campuses have in developing sustainability programs. The resolution goes further to encourage the campuses to develop and implement programs and plans in concert with the ACUPCC and the Governor's Executive Order. [See Appendix A3]

### 2.1 Chancellor's Advisory Task Force on Sustainability

The Chancellor's Task Force on Sustainability (Task Force), was formed in January 2008 and was originally known as the Campus Council on Sustainability. Seeking more formality and broader campus participation, Chancellor Wilson asked that the group serve as an advisory task force and set forth a charge that included the purpose of the group, membership and reporting requirements. The Task Force serves as the responsible entity for promoting and educating on sustainability, developing greenhouse gas inventories and climate action planning, and recommending specific projects to meet the requirements of institutional commitments. Task Force members also work with the academic and research communities to further inform the UC Denver sustainability programs.

The Task Force consists of a Chairperson from the Finance and Administration department, at this time the Assistant Vice-Chancellor of Facilities Management, as appointed by the Vice-Chancellor of Finance and Administration. Task Force membership includes students, faculty and staff from across schools and departments and members serve for two year terms. Subcommittees are formed as needed to address specific issues and projects and the group as a whole meets on a monthly basis. The Task Force is required to provide a progress report to the Chancellor once a year. (Chancellor's Charge, Appendix A4)

## 2.2 University of Colorado Denver Campuses

UC Denver's world-class academic, clinical and research programs take place on two different campuses in the greater Denver metropolitan area.

- Anschutz Medical Campus (AMC) in Aurora: UC Denver's newest campus, the AMC has been developed since 1999 and is the newest and largest healthcare research and education campus in the Rocky Mountain west. The campus serves 10,000 students, faculty, staff and patients everyday and is located in a biomedical zone that includes University Hospital and The Children's Hospital. The campus has over 2 million square feet of research and educational facilities.
- Denver Campus: The Denver Campus is part of the Auraria Higher Education Center. The Auraria campus is a unique educational center in downtown Denver and is the largest urban educational center in the country with an estimated daily population of 48,000 people. This community consists of three separate schools: Community College of Denver, Metro State and University of Colorado Denver. UC Denver makes up 32% of the campus population and many schools and programs of UC Denver are located entirely on the Auraria campus. UC Denver also owns three buildings in the lower downtown (Lodo) area of Denver across the street from the Auraria Campus. These three buildings house multiple departments and programs including the College of Architecture & Planning, the School of Public Affairs, the School of Education and Human Development, the Business School and the Executive Administration.
- 9th & Colorado Campus (former University of Colorado Health Sciences Campus): This campus served as the medical and health sciences education and research campus from the start of the 20th century until the Anschutz Medical Campus was built. In 1999, a phased move of all students, faculty and staff began and was completed in 2009. This property has been sold and is now being reconstructed as a mixed-use development. This campus is mentioned as it was included in the baseline inventory for Greenhouse Gas Emissions.

## 3.0 UC Denver Greenhouse Gas Emissions

Greenhouse Gas Emissions (GHGs) are six gases that can have negative consequences on the atmosphere when too much is present. Concentrations of these gases in the earth's atmosphere can increase the earth's natural greenhouse effect, allowing for a gradual long-term heating of the earth's climate. This change in the climate has the potential to cause catastrophic environmental damage in many locations on the surface of the earth.

The six greenhouse gases consist of three naturally occurring gases: carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (NO<sub>2</sub>); and three synthetic gases: hydroflouorocarbons (HFCs), perflouorocarbons (PFCs), and sulfur hexaflouride (SF<sub>6</sub>). While all six gases contribute to climate change, some are many times more potent than CO<sub>2</sub>, yet they occur in much smaller quantities. For example, methane has a warming potential that is 21 times as Carbon Dioxide. All GHGs in the UC Denver inventory are measured in Metric Tons of Carbon Dioxide Equivalent (CO<sub>2</sub>e), or the Metric Tons represented by CO<sub>2</sub> and the other five gases as a single emissions factor. [See: [IPCC, 2007: Climate Change 2007: The Physical Science Basis](#). Contribution of Working Group

I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Solomon, S., D. Qin, M. Manning (eds.)]

### **3.1 Greenhouse Gas Emissions Scopes**

Scope 1 GHG emissions are those directly occurring from sources that are owned or controlled by the UC Denver, including on-campus stationary combustion of fossil fuels and mobile combustion of fossil fuels by fleet vehicles. Scope 2 emissions are indirect emissions generated in the production of electricity by Xcel Energy and consumed by the university. Scope 3 emissions are all the other indirect emissions that are "a consequence of the activities of the institution, but occur from sources not owned or controlled by the institution" such as commuting, air travel for university activities, waste disposal, etc. UC Denver's GHG Inventory accounts for Scopes 1-3, however, projections for GHG emission trajectories have only been made for Scopes 1 & 2 due to the certainty of data control that UC Denver has over the growth of those emissions. Scope 3 emissions also have planned reductions but are not as readily or clearly calculated for in the amount of expected total GHGs reduced.

### **3.2 Process**

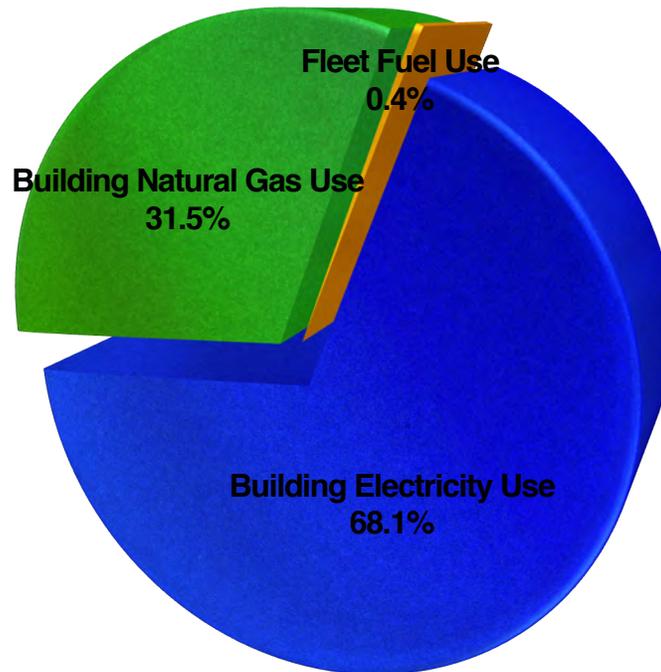
University administration partnered with the UC Denver IGERT Program in Sustainable Urban Infrastructure to develop the university's first GHG inventory. The class, entitled "Defining and Measuring Sustainability", worked with administrative staff to collect and develop data on electricity and natural gas use, transportation fuels, air travel and materials used in university operations. This data was used to develop the GHG inventory from the World Resource Institute GHG Protocol. The class worked for several months to gather the data and calculate the GHG emissions and then presented the findings to university administration. The result was a very comprehensive and well developed inventory that had the secondary benefit of educating university administration on how these inventories are created.

### **3.3 GHG Emissions Inventory, Scopes 1 & 2**

UC Denver's Scope 1 & 2 emissions total 112,368 MT-CO<sub>2</sub>e for the baseline year of 2006. This represents natural gas fuel used for steam production the Central Utility Plant and gasoline and diesel fuels used in our campus automobile fleet. It also represents electricity purchased from Xcel Energy to power the water chillers in the Central Utility Plant and provide electric power and lighting to campus buildings. Over 99% of all Scope 1 & 2 emissions represent building energy use. It should be noted that the university vehicle fleet is very small therefore representing less than .30% of Scope 1 & 2 emissions. [See Chart 3.3, page 6]

[Note: *The GHG inventory includes energy use from buildings at the 9th & Colorado Campus that were part of the UC Denver building inventory until 2009. Future GHG inventories and GHG reduction plans will not include these buildings as the campus has moved and the property was sold to a development entity. The Central Utility Plant at AMC also produces steam and chilled water for both University of Colorado Hospital and The Children's Hospital. Both are separate entities and emissions associated with the hospitals are not considered part of the UC Denver GHG inventory.*]

Chart 3.3 UC Denver GHG Scope 1 & 2 GHGs



**3.4 GHG Emissions Inventory, Scope 3**

UC Denver’s Scope 3 emissions, or those emissions associated with the purpose of the university but outside of the university’s direct financial control, totaled 44,998 MT-CO<sub>2</sub>e in 2007. Of Scope 3 emissions, 80% is personal automobile commuting and airline travel and the rest lies in fuel manufacturing and materials use such as water, paper and food. Commuting represents 23% of all UC Denver greenhouse gas emissions. [See Charts 3.4A & 3.4B, below]

Chart 3.4A UC Denver Scope 3 GHGs

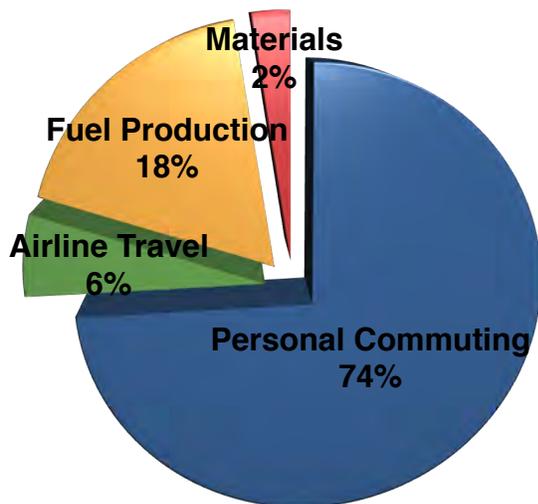
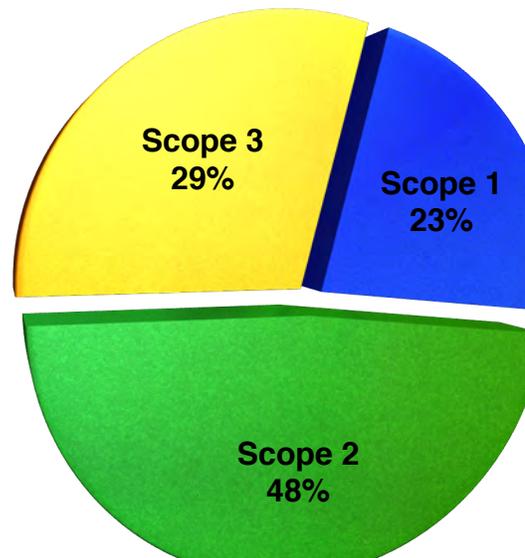


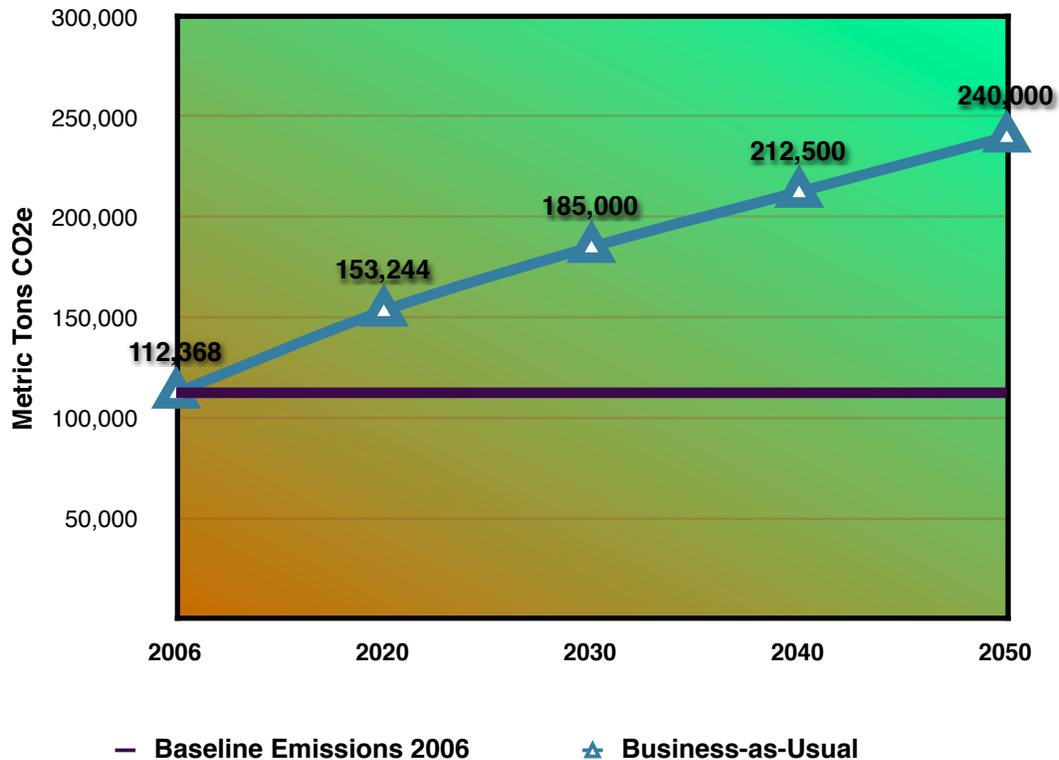
Chart 3.4B UC Denver Scope 1-3 GHG



### 3.5 Emissions Trajectory

Considering campus growth, a business-as-usual approach, which assumes no additional GHG reduction initiatives are implemented, would generate 153,244 MT-CO<sub>2</sub>e of Scope 1 & 2 emissions by 2020, a 36.8% increase from the baseline. A trajectory line drawn to 2050 would assume growth to an estimated 240,000 MT-CO<sub>2</sub>e, an increase of 113% from the baseline. [See Chart 3.5, below]

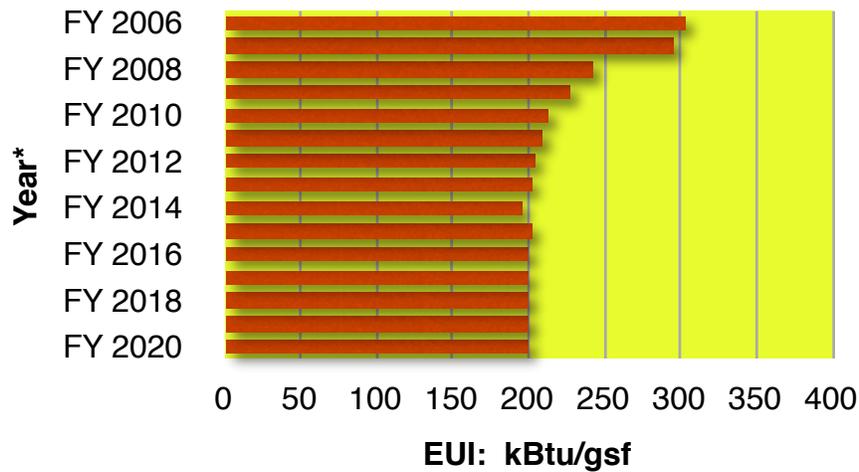
Chart 3.5 UC Denver Scope 1 & 2 GHG Trajectory, 2006 - 2050



### 3.6 Normalizing for Growth

UC Denver has and will continue to add a number of buildings to accommodate growth in academic and research programs, totaling nearly 1 million new square feet from 2006 - 2020. The Energy Use Index (EUI), or kBtu per square foot, for the baseline year of 2006 is 303. EUI measured for 2009 is 227, a decrease of 25% from baseline and estimates for 2020 assume an EUI of 200, a 34% decrease from baseline. This represents a decrease of 18% in GHG emissions per square foot to 2020. Although this plan calls for absolute reduction of GHGs, the university will use this EUI to measure progress on energy efficiency and conservation in buildings to compare GHG emissions reductions per building as the campus grows. [See Chart 3.6, page 8]

**Chart 3.6: UC Denver Energy Use Index (EUI) 2006 - 2020**

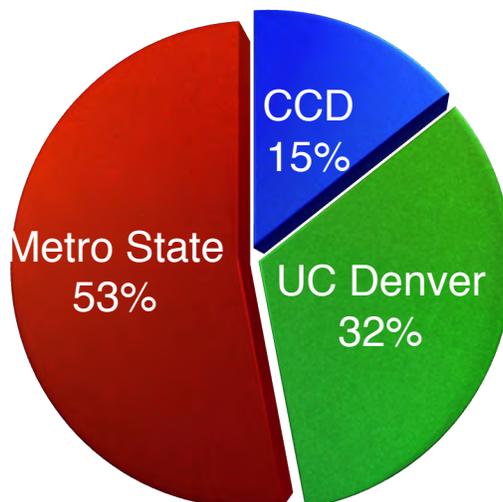


\* Years 2011 - 2020 are engineering projections based on expected natural gas and electricity use in additional buildings.

### 3.7 Emissions from the Auraria Higher Education Campus

UC Denver’s students, faculty and staff represent 32% of the facility space used on the Auraria Campus. UC Denver’s share of GHG emissions comprises 13,100 MT-CO<sub>2</sub>e of the total campus inventory of 48,000 MT-CO<sub>2</sub>e. Since space used on the Auraria campus is shared by three higher education entities, the university will work with the Auraria administration to set emissions goals, develop GHG reduction projects and measure progress. These emissions are not represented in the UC Denver inventory and reductions are not planned for in this document. This plan will be a separate document to be developed by representatives from the three institutions and will be presented by the administration of the Auraria Higher Education Center. [See Chart 3.7, below]

**Chart 3.7 Auraria GHG Emissions (GHG/sq.ft of use), 2008**



#### 4.0 Greenhouse Gas Reduction Plan

The ACUPCC states that an overall, or absolute, reduction of 80% of current GHG emissions by 2050 is needed to prevent serious climate disruption. The Chancellor’s Task Force recommends a 40 year incremental plan to chart a path to the 80% goal. Consistent with other campuses and with the State of Colorado’s Climate Action Plan, the Task Force recommends the following goals for absolute GHG emissions reductions from Scopes 1 & 2:

- By 2020: A 20% reduction from 2006 baseline of 112,368 MT-CO<sub>2</sub>e. This represents a reduction of 22,474 MT-CO<sub>2</sub>e creating a total inventory of 89,894 MT-CO<sub>2</sub>e.
- By 2030: A 50% decrease from 2006 baseline to a total inventory of 56,184 MT-CO<sub>2</sub>e
- By 2050: An 80% reduction from 2006 baseline to a total inventory of 22,474 MT-CO<sub>2</sub>e

These reduction goals are planned to be met in three phases. The majority of emphasis will be placed on meeting the most immediate goals in Phase 1 through year 2020. This phase is vital as the most direct reductions can be made to start driving the university GHG trajectory downward and allow for more options in developing future phases which will depend heavily on new, clean energy production. Later phases will be conceptualized and developed as funding and technology allow [See Chart 4.1, page 11].

#### 4.1 GHG Emissions Targets & Phasing

•**Phase 1A (2010 - 2012):** Fulfillment of the Governor’s Executive Order on the Greening of State Government - 10% reduction in Energy Use Index (EUI), 20% reduction in paper use, 10% reduction in water consumption, 25% reduction in petroleum use and a “zero-waste” goal for all construction and facility operations. The table below [Table 4.1] summarizes performance benchmarks to meet the goals.

**Table 4.1: Governor’s Executive Order Benchmarks**

	<b>FY 2005/6 Baseline</b>	<b>FY 2006/7</b>	<b>FY 2007/8</b>	<b>FY 2008/9</b>	<b>FY 2012 Goals</b>
Energy (kBtu/SF)	303	295 (-3%)	242 (-20%)	227 (-25%)	270 (-10%)
Water (gal/SF)	34.0	40.5 (+19%)	59.9 (+76%)	49.1(+44%)	30.6 (-10%)
Petroleum (gal/year)	5,910	7,221 (+22%)	6107 (+3%)	5072 (-14%)	4433 (-25%)

- Energy reduction goals were achieved in FY 2007/8.
- Water use has increased as a result of moving to a larger campus with more irrigation requirements and more water used in chillers for campus building cooling than is

represented in the 2005/6 baseline. This water used for the hospital's steam and chilled water is also included in these measures. Sussing out their water use could show more progress for UC Denver in reducing total water used. Water efficiency measures already taken show a decrease of 18% between FY 2007/8 and FY 2008/9.

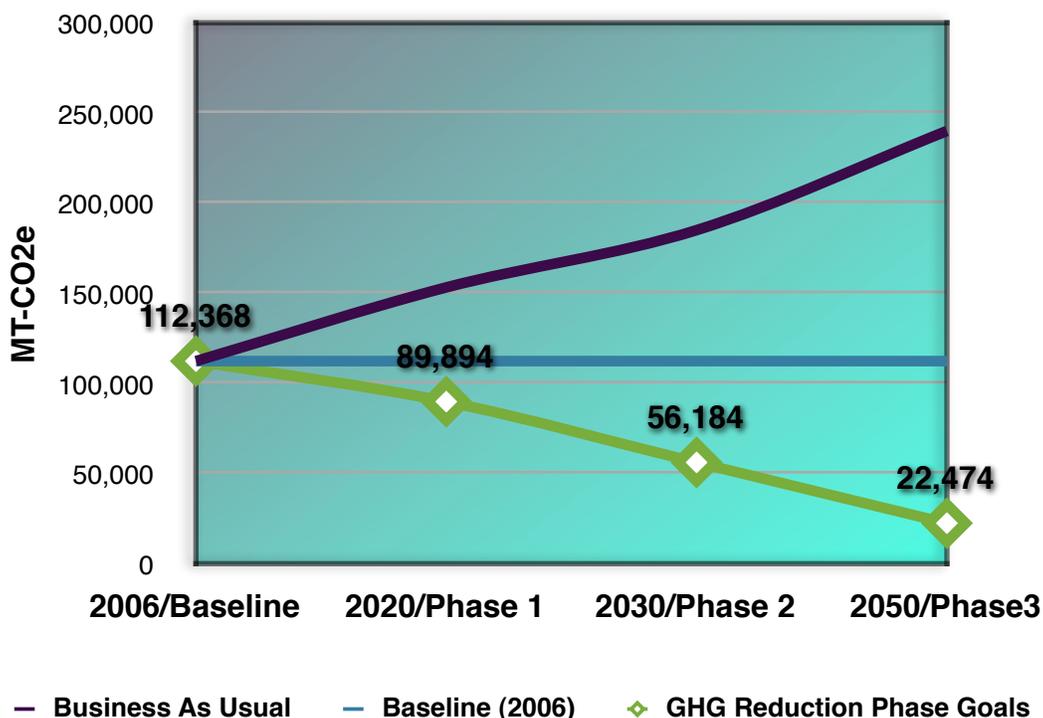
- Petroleum use has decreased as the university's fleet has become minimal and many facilities management vehicles have been replaced with electric carts and bicycles.
- The Executive Order also provides for a 20% decrease in paper use by 2012 from the 2005/6 baseline. This baseline data does not exist and currently paper reports are not received in a consistently measurable manner. The university will report on paper use when data is available. Policies for requirements of 30% recycled content paper and copiers with defaults for two-sided printing will help achieve the 20% goal.

**•Phase 1B (2010 - 2020) Energy Efficiency, Conservation and Small-Scale Renewables - 20% reduction in GHG emissions.** This phase will concentrate on a number of initiatives to make campus buildings more energy efficient, change campus behaviors to conserve energy and use small-scale, on-site renewable energy to provide building electricity. Purchased wind electricity, Renewable Energy Certificates (RECs) and carbon offsets will also be considered in order to assist in meeting the 20% emissions reduction goal.

**•Phase 2 (2020 - 2030): Large-Scale Renewables - 50% decrease in GHG emissions.** This phase will involve conglomerate business enterprises and partnerships among universities, local communities, counties and the business community to develop large-scale renewable energy facilities. This will likely be a mix of large wind farms and solar energy production plants. Localized, or community nuclear technologies should also be considered.

**•Phase 3 (2030 - 2050): New and Emerging Technologies - 80% reduction in GHG emissions.** These technologies are still in research and development phases but should be considered as likely alternative energy sources by the year 2050. These include, but are not limited to, nuclear fusion energy, hydrogen energy infrastructure, and advanced energy storage capabilities.

Chart 4.1 GHG Reduction Phases 1-3



#### 4.2 Phase 1 Emission Reduction Initiatives to 2020

The university is realizing a significant energy use and GHG reductions from the business-as-usual approach by building a new, modern and more efficient campus. Many energy efficiency measures have been taken in new construction including efficient lighting, daylighting, localized evaporative cooling, heat return systems and more efficient electrical equipment. Other efficiency measures such as temperature set-point changes, induction lighting in the parking garage and the retrofit of research buildings to reduce airflow and lighting electricity use are also decreasing energy use and GHG emissions. The new School of Pharmacy will be the university’s first LEED certified building with two more LEED projects in development (Health and Wellness Center and The School of Dental Medicine addition) and a requirement to build all new construction and major renovations to LEED standards. This has and will continue to result in a significant drop from the business-as-usual scenario, with an anticipated reduction of 27,991 MT-CO<sub>2</sub>e of Scope 1 & 2 emissions by 2020. Other emissions reductions must be realized in order to meet the 2020 goal of an additional 35,622 MT-CO<sub>2</sub>e. [See Chart 4.2B]

The Task Force has developed a plan to further reduce emissions to 2020. These emissions fall in the purview of realistic direct emissions cuts and comprehensive programs will be developed to ensure successes and subsequent reductions. Planned GHG Reduction initiatives to 2020 include:

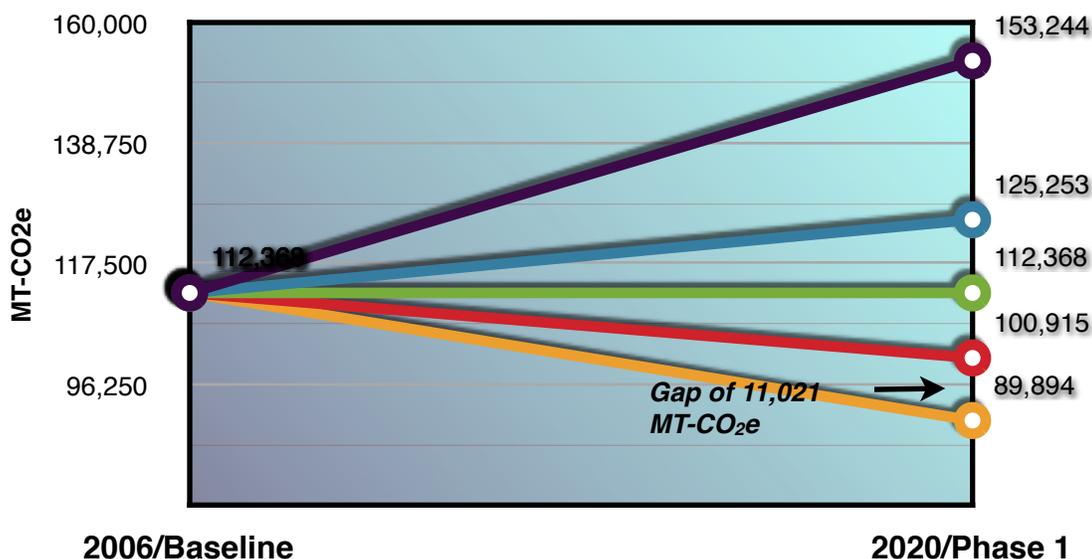
- **Behavioral Conservation Campaign:** This campaign will be an education, marketing and outreach campaign to inform the campus community of how each individual can assist the university on reducing energy use and cutting emissions. Reminders for turning off lights and powering off computers will be placed around campus labs, classrooms and

offices. In university laboratory facilities, a fume hood sash management program is being instituted that will encourage lab users to close the sashes to save energy. It is believed that up to 65% of the energy used by these hoods can be reduced with a proper sash management and monitoring program. Behavior changes on campus can account for a reduction of 2,300 MT-CO<sub>2</sub>e.

- **IT Greening:** The move to a central server computing program will have a positive impact on campus energy use and technology expenditures. Often referred to as a thin client, this program would allow for personal computing to take place with less equipment than traditional desktops. By placing the actual computing in a central IT infrastructure location, users simply need an interface at their desktop that is smaller and more efficient than a full PC. If the university can convert 4,000 current desktop computer to a thin client application, the university can save over \$143,000 in energy costs and reduce emissions by 1,538 MT-CO<sub>2</sub>e.
- **Electric Grid Changes (Xcel Energy):** The university currently purchases electricity from Xcel Energy Corporation. Xcel's energy mix is heavy on fossil fuels, notably coal-powered electric plants. This constitutes a carbon dioxide equivalent production of 0.8 kilograms per kilowatt hour of electricity. Xcel is currently developing programs to assist themselves and their customers reduce GHG emissions. This includes an updated and more efficient power delivery system (transmission and distribution), an advanced Smart Grid program for residential and business customers and a retrofit of some coal-powered plant to natural gas fuel. They also anticipate bringing more renewable energy onto their power grid. These changes are projected to reduce yearly emissions for UC Denver by 12,000 MT-CO<sub>2</sub>e by 2020.
- **LEED Projects and Adoption of the International Energy Conservation Code 2009 (IECC 2009):** By state law, all newly constructed buildings and major renovations will be LEED Gold certified or better. Currently the Pharmacy and Pharmaceutical Sciences Building, the Health and Wellness Center and the School of Business are in varying stages of design and construction to meet LEED Gold certification. By 2020, the university will construct and renovate over 1 million new square feet, with nearly all of that falling into LEED certification. UC Denver Facilities Projects is also working internally and with the Office of the State Architect to incorporate the IECC 2009 into the standards for all construction and renovation projects. This stricter energy code and the energy requirements of LEED will reduce buildings emissions by another 5,000 MT-CO<sub>2</sub>e.
- **Campus Energy Efficiency Projects:** The Task Force has worked with university electrical and mechanical engineers and with the Facilities Projects group to find, define and quantify energy efficiency measures that could decrease buildings energy use at the Downtown and Anschutz Medical Campus. While some projects have significant energy savings potential and reasonable payback periods, others may be too expensive to pursue due to upfront costs and paybacks of more than 20 years. Some of these projects may be coupled to achieve better paybacks and others may be pursued for operational reliability issues if payback and lifecycle costs are in a range decided through internal criteria. Not all projects are feasible but the university can reduce another 3,500 Mt-CO<sub>2</sub>e if high priority projects are implemented. [See Appendix A5]

These reduction initiatives are projected to save an additional 24,338 MT-CO<sub>2</sub>e, bringing the GHG inventory to 100,915 MT-CO<sub>2</sub>e. This will leave a variance of 11,021 MT-CO<sub>2</sub>e between planned emissions reductions and the 2020 goal of 89,894 MT-CO<sub>2</sub>e. [See Chart 4.2, below]

**Chart 4.2 Phase 1 Emissions Reductions to 2020**



- -
- B-A-U
Actual/Projected
Baseline  
Planned Reductions
GHG Reduction Goal

### 4.3 Potential Emission Reduction Initiatives to Reach 2020 Goal

The remaining emissions after the suggested reduction initiatives are implemented total 11,021 MT-CO<sub>2</sub>e. For perspective, this represents 15.8 million Kilowatt hours of electricity, or enough to power 1,377 Denver-area homes for one year. The university administration will choose how the remaining emissions will be reduced from a number of options suggested by the Task Force. Costs, GHG reductions, feasibility and funding are being studied for these options. These options include, but are not limited to:

- Geothermal Heating and Cooling
- Solar Photovoltaic
- Passive Solar Hot Water
- Purchased Wind Power
- Renewable Energy Certificates
- Carbon Offsets

It will likely require a mix of these options to get UC Denver closer to filling the gap. Whatever cannot be filled by direct reductions through renewable energy will likely come from RECs or carbon offsets. Current RECs for the university to cover the 15.8 million kWh would total

## University of Colorado Denver

Anschutz Medical Campus • Denver Campus

\$40,022 per year (Or 0.000259 per kWh; this is the current price Auraria pays for wind RECs). Carbon offsets through the Colorado Carbon Fund at \$20 per ton would cost \$225,680 per year. (See <http://www.coloradocarbonfund.org/>)

### 4.4 Scope 3 GHG Emissions Reductions

The University will also address Scope 3 emissions to further reduce the total GHG inventory. UC Denver's Scope 3 emissions, or those emissions associated with the purpose of the university but outside of the university's direct financial control, totaled 44,998 MT-CO<sub>2</sub>e in 2007. Of this, nearly 80% is personal automobile commuting and airline travel and the rest lies in materials such as water, fuel and paper. UC Denver will develop programs that will address Scope 3 emissions in introducing more commuter options, more efficient procurement processes and waste reduction initiatives. These initiatives include:

- **RTD FLEX Pass:** Students at both the Downtown and Anschutz Medical Campus currently purchase EcoPass, or monthly bus passes from the Regional Transportation District (RTD). Discounts of 20% are offered by the university for all RTD products. The RTD FLEX Pass program is currently being implemented at the university to provide a 30% , pre-tax discounted monthly pass to employees. The program requires that at least 200 passes are purchased monthly and the goal will be to grow that number over the next year through promotions, including parking vouchers for days when pass-holders need to drive to work.
- **Zimride:** Zimride is a rideshare program recently launched by UC Denver. It allows students faculty and staff to use a social networking platform to establish carpools and ridesharing among the campus communities. Zimride matches riders by location and schedule and provides for a safe and convenient network to create multi-passenger car trips to campus. This a free service for all individuals on campus and allows the administration to calculate money and GHGs saved for all rides that are registered on the interface site. UC Denver also offers discounted carpool parking to further encourage people to participate in the program.
- **RTD Lightrail:** The Denver metro area has an expansive lightrail system that assists with commuting from the southern suburban areas to central Denver. This system is being expanded to communities west and north, as well as to the Denver International Airport. The Downtown Campus is already well-served by this system and student, faculty and staff use is very high. The Anschutz Medical Campus is to be served by this system before 2020 thus assisting efforts to reduce GHG emissions by single-occupancy vehicles.
- **Procurement:** The administration works closely with CU System Procurement services to monitor purchases of more sustainable goods and to create contracts that benefit campus GHG reduction goals. Currently, the Sustainability Council, represented by sustainability staff from each CU campus and Directors from Procurement Services, is developing sustainable purchasing policies for paper, electronics and energy services. Current projects include a move to purchasing only paper with 30% recycled content and renewing copier/printer contract with EnergyStar machines with mandatory double-sided printing. A system-wide template is also being developed to allow renewable energy systems to be financed through third parties in order to take advantage of certain tax credits and avoid debt rating issues.

- **Expanded Recycling:** The University currently has a single-stream recycling program through Recycle America. While well-used, there are significant opportunities to increase recycling rates on both campuses. This year, February was established as Recycling Month for UC Denver with a goal of increasing recycling collection by 10%. An education and marketing campaign was used to spread the word and incentives were offered to individuals who had creative ideas on how recycling could work better on campus. The response was good and it assisted Facilities Management with placing new recycling containers at more appropriate and usable locations on campus. Recycling Month promotions will continue every year in February. UC Denver is also expanding the recycling program to outdoor areas on the Anschutz Medical Campus. Facilities Management recently applied for and received a grant to purchase 30 permanent outside recycling containers to be placed in the Research and Academic quadrants on the campus. It is believed that by offering these receptacles outdoors, recycling rates will increase as people move across the campus and can access recycling as opposed to only waste containers.

### 5.0 Feasibility Assessments

Making investments to reduce GHG production requires that the University carefully weigh the social and potentially mandated requirements for reducing GHG production and our fiduciary responsibility as stewards of public funds. To ensure the university balances these requirements, internal criteria will be established to guide investments focused on reducing GHG production, and they may be modified to meet the needs of the institution and/or changes in the operating environment.

#### 5.1 Guidelines for Investing in Greenhouse Gas Reduction Initiatives

Although all activities resulting in a reduction in GHG production are desirable, as stewards of public resources we must ensure that all investments in GHG reductions constitute an efficient and appropriate use of public funds. To help inform the decision making process the University of Colorado Denver will make use of a set of guidelines. The guidelines are intended to balance the university's role as steward of fiscal resources with the university's role as a partner in the stewardship of the planet.

As alluded to above, the guidelines for investments in GHG reductions are based on financial criteria and total GHG reduction.

The first criteria is the payback period of the initiative. Generally speaking, initiatives with a payback period of 10 years or less are considered financially viable. Projects with paybacks of greater than ten years will be considered if they offer significant benefits to the university. Reasonable estimates of cost avoidances and improvements in operations resulting from initiatives can and will be factored into the payback calculations. Additionally, life cycle costs and benefits will be included in the calculations. The objective is to accrue and account for cost savings over the entire lifecycle of the systems replaced as part of a project. Investments in projects where the payback period is represented by the lifecycle of the replacement systems are to be discouraged.

Although long term inflation is likely, inflation in utility rates will not be used as part of the evaluation criteria. Similarly, posited regulatory costs will not be used in the evaluation of decisions until such time as regulations are enacted.

In addition to financial evaluation criteria, operational criteria can be used to guide investment decisions. Given the complexity of buildings projects that improve the reliability and predictability of building systems or increase operational efficiencies will also be evaluated favorably.

Evaluation of GHG Reductions will be focused on Scope 1 and Scope 2 reductions as the University has the greatest control over these activities. Although Scope 3 reductions may not be the principal source of the university's GHG reductions they will be considered as appropriate.

### **5.2 Funding Mechanisms**

Various funding opportunities exist for GHG reduction projects from both within and outside of the university. Internal funding could come from general fund allocations, user fees, and the issuance of treasury bonds. The establishment of a revolving loan fund is crucial to the success of climate action related projects to insure that savings from projects can be reinvested back into the loan and dispersed as projects are selected. External funding could come from local, state and federal grant funding programs, private contributions and third-party financing. Another option will be the use of performance contracting for efficiency and renewable energy projects that will allow for the projects to be paid for over time through energy savings.

### **6.0 Academic and Research Programs**

UC Denver has a number of established programs at the undergraduate, graduate and professional levels that concern themselves with climate change and general sustainability curriculum and research. In many ways, these innovative programs have been ahead of UCD administrative decisions regarding climate change and sustainability issues and are now informing the rest of the University in climate action planning.

The cross-disciplinary approach to addressing the climate change issue found in these programs is one now realized as completely necessary to tackling an issue this large at any institutional level. Faculty continue to grow the number of courses offered at all levels and student groups on campus are active communicating the cultural and behavioral changes necessary to reduce natural resource use on campus. A number of research centers also extend UC Denver's efforts in the field of sustainability with "real world" applications in communities across the state. Some of these courses are listed below and a complete list can be found in Appendix A6.

## 6.1 College of Architecture and Planning

•**Master's in Urban and Regional Planning, Concentration: Land Use and Environmental Planning:** This MURP concentration prepares students for making and administering plans and policies at all levels including neighborhood, city, watershed and region. Land use and environmental planning emphasizes regulation of land uses and development processes, organization of transportation infrastructure and other major public investments, and management of urban ecology, environmental quality and natural resources

•**Colorado Center for Sustainable Urbanism:** The center examines one of Colorado's most urgent challenges—creating livable communities in the context of a booming population. This center studies growth-oriented issues, disseminates information, tests growth scenarios and provides expertise to cities and organizations involved in growth-related issues.

•**Colorado Center for Community Development:** The Colorado Center for Community Development assists organizations, communities, and neighborhoods which cannot afford or do not have necessary access to technical or educational assistance to affect desired changes. The efforts of the Center are focused primarily on rural towns, low-income communities, and development organizations.

## 6.2 Business School

•**MBA, Managing for Sustainability Specialization:** Provides business students with an understanding of the business issues associated with managing for sustainable growth including issues facing businesses in a world where resources are scarce, social safety nets are declining, and customers and commentators are concerned about companies behaving in an ethical and responsible manner. Approaches alternative ways to reduce the negative impact of economic activities through environmental finance and accounting, corporate social responsibility, social entrepreneurship, and social marketing. Examines the role business has in fostering the long-term health and viability of communities, the environment and the company.

•**MS in Global Energy Management (GEM):** Provides students with a leadership and business education focused solely on the energy industry. Developed in partnership with leading energy companies, the curriculum addresses the practical, real world considerations and challenges energy companies face on a daily basis. GEM is designed to equip future leaders with the tools needed to find solutions to the issues and opportunities found in conventional (oil, gas, coal), nonconventional (oil sands, shale), alternative (nuclear, coal gasification) and renewable (solar, wind, bio-fuels, etc.) energy businesses. This real-world curriculum is taught by faculty members from around the world who have extensive experience in the energy industry.

### 6.3 College of Engineering and Applied Science

•**MS, Environmental and Sustainability Engineering and MEng, Sustainable Infrastructure:** Program provides extensive education on engineering sustainable infrastructure in urban and local environments.

•**The Transportation Research Center:** Seeks to address local, state, national, and international concerns in all areas of 21st century transportation. The Center works in collaboration with other colleges and businesses, and has established several partnerships with Colorado's high-tech industry.

### 6.4 College of Liberal Arts and Sciences

•**Sustainability Undergraduate Minor:** Sustainability as one of the CLAS approved Signature Areas has participation from most of the departments in the College contributing expertise of faculty to the interdisciplinary integration of scientific principles, historic trends, philosophic theories and cultural forces that frame the socio-economic and ecological issues in the study of sustainability. Two separate courses were offered in the 2009-10 academic year.

•**MS Social Sciences Degree: Society & the Environment Option:** Society and the Environment is an interdisciplinary option for completing the Master of Social Science that emphasizes the human side of environmental issues, while also emphasizing that human issues are never separate from issues of ecology. It challenges students to apply knowledge from the social and biological sciences to environmental problems across a broad spectrum of institutional sectors and geographic locations. Applications include environmental hazards and disasters, environmental impact assessment, protected area management and interpretation, collaborative conservation, ecoregion conservation, conservation policy, and international development.

•**International Studies BA, Concentration in Economics, Development and Environment:** Taking this concentration provides students an understanding of economic processes in an international context. The courses offer comparative approaches and cultural perspectives on development and environment. Students will gain an understanding of economic principles and the social science skills needed to understand the multiple policy choices facing world leaders and local actors.

•**Department of Anthropology, Sustainable Development and Political Ecology Concentration:** This concentration provides a critical perspective to issues of development and resource conservation, multi-cultural and multi-disciplinary perspectives. A particular strength of this program is the integration of theoretical knowledge with field-based training opportunities. Three major themes are addressed within this concentration: the types of resource management systems that exist around the world and their relationship to particular ecosystems; the types of knowledge systems and ideas that are associated with this diverse array of resource management systems ; and the culture of the global and local institutions – from small-scale NGOs to the World Bank – that design and implement conservation and development. A central goal of this emphasis is to help students imagine careers in conservation and/or development, and to provide them with

information, opportunities, and resources to pursue a wide variety of career options.

•**Center for Environmental Sciences:** The Center for Environmental Sciences was founded to promote disciplinary and interdisciplinary research in a wide array of areas within the environmental sciences. Services provided by the Center are available to all members of the University community, as well as to members of the public and private sectors through joint partnerships.

## 6.5 School of Public Affairs

•**MPA Concentration/Graduate Certificate: Environmental Policy, Management and Law:** The Environmental Policy, Management, and Law (EPML) program provides qualified applicants with an understanding of how the environment is affected by relationships between various entities, including legislatures; administrative agencies; courts; federal, state, and local governments; government and the nonprofit and private sectors; and government and the public it has been established to serve. Offered by the School of Public Affairs, University of Colorado Denver, the EPML program can be taken as either a stand-alone graduate certification program or as an emphasis area within the school's Master of Public Administration curriculum.

•**Wirth Chair in Environmental and Community Development Policy:** The Wirth Chair in Environmental and Community Development Policy honors the environmental and sustainable development achievements of former Senator and Undersecretary of State Timothy E. Wirth. The Wirth Chair is committed to helping governments, businesses, nonprofit groups and community organizations form sustainable development partnerships that carefully balance economic, environmental and expanded social welfare objectives and strategies. The mission of the Wirth Chair is to foster effective sustainable development strategies that will strive to meet the needs of the present without compromising the ability of future generations to meet their own needs. The Wirth Chair works to develop: meaningful environmental protection policies and programs; cost-effective energy management and energy efficiency programs; sound greenhouse gas emission reduction strategies; and fair and effective growth management strategies.

## 6.6 Colorado School of Public Health

•**Department of Community & Behavioral Health:** Community & behavioral health merges the fields of sociology, psychology, anthropology and epidemiology to assess community needs and develop programs and policies that promote health, prevent disease and enhance quality of life. Research and degree programs emphasize community involvement and collaboration along with scientific evidence to understand and influence health and well-being as well as tools to educate for healthy living.

•**Department of Environmental & Occupational Health:** Environmental & occupational health ensures our residential, professional and industrial environments are safe and sustainable. Researchers work closely with industry and policy makers to address issues of clean air and water, environmental health hazards, community and urban development, laws and regulations and sustainability.

•**High Plains Intermountain Center for Agricultural Health and Safety:** The mission of the High Plains Intermountain Center for Agricultural Health and Safety (HICAHS) organization is to reduce and ideally eliminate accidents, injuries, diseases and deaths resulting from agricultural operations through education, intervention and research. Located on the Colorado State University campus in Fort Collins, Colorado, HICAHS is a multi-disciplinary organization with input from a variety of areas including engineering, industrial hygiene, education, toxicology, social work, epidemiology, environmental health, and agricultural sciences. The HICAHS center is one of ten national centers dedicated to agricultural health and safety.

•**Center for Global Health:** Serves to improve health and healthcare in communities around the world, through interdisciplinary collaboration within the University and with partners in research, education and health services. The CGH serves as a focal point for global health activities within the University and broader community. The CGH also brings together faculty from various disciplines at the University of Colorado and other Colorado universities to develop and participate in interdisciplinary research on significant global health issues.

## 6.7 Miscellaneous

•**International Education, Study abroad programs in Conservation:** Example: Grenada: Sustainability in the Caribbean: a 2010 Maymester geography/environmental science study tour to explore sustainability in Granada in the context of a developing country including hands-on experience with devising and implementing possible solutions to locally-needed research questions and agendas.

•**The IGERT Center for Sustainable Urban Infrastructure:** UC Denver received a prestigious \$3.2M Integrative Graduate Education and Research Traineeship (IGERT) grant from the National Science Foundation to develop an innovative inter-disciplinary graduate program on sustainable urban infrastructure. The award supports 26 doctoral students during the five-year grant period from 2007-2012. The graduate program, the first of its kind in the country for its breadth across disciplines, spans the Colleges of Engineering, Architecture and Planning, Public Affairs, and Liberal Arts and Sciences.

•**UC Denver Downtown Signature Initiative in Sustainability:** From funds committed by the Provost, a plan has been developed to start, support and promote interdisciplinary work in sustainability. [See Appendix A7]

## 7.0 Measuring Progress

The Task Force will measure progress on a project by project basis by developing estimates that can be verified through metering and billing upon the conclusion of projects. Data gathered from the projects will be collected and once per year overall GHG reductions will be reviewed and emissions projections will be altered as necessary. The Task Force will provide an annual report card on the status of the achievement of goals.

This process will be transparent. All information will be shared on the Climate Action Plan webpage in the Sustainability section of the university website (<http://www.ucdenver.edu/about/departments/FacilitiesManagement/Sustainability/Pages/ClimateActionPlan.aspx>). Changes to the plan will be vetted through university governance groups and the Executive Administration. Reports will be made to the ACUPCC and the Governor's Energy Office as required. Continued education on the climate plan, progress and general sustainability to the university population will remain a continued function of the Task Force and the Sustainability Officer.

### 8.0 Conclusion

When initially investigating the realm of possibilities for GHG reductions, UC Denver considered a hard date for carbon neutrality. In considering the specific projects, timelines, university growth, revenues, new technologies, etc., the Task Force recommends a plan that concentrates on the immediate and near future in order to continue to change our climate trajectory downward. Better and more robust decisions will be made at times of more certainty. The recommended plan's goals are consistent with the State of Colorado Climate Action Plan and University of Colorado System plans.

It remains to be seen if all of the reduction goals to 2020 can be met with the initiatives listed. Significant investments in behavioral conservation, building design and construction, IT greening and energy efficiency will be required. Declining budgets in recent years will affect this in the early years of the first phase, but it is hoped that as state revenue support increases, increased amounts of funding can be spent on these reduction initiatives as long-term resource savings measures.

The development of this plan has informed UC Denver on its own strengths and weaknesses has allowed the university to evaluate its resources. Silos that exist naturally inside of a large institution must be overcome to completely address sustainability as a function of the university. The development of this plan has allowed for the administrations, specifically Facilities Management, to interact extensively with the academic and research communities to develop data and design solutions for climate action planning. This continued cohesiveness will assist both communities going forward.

While this plan can, and almost certainly will, change, it charts a path forward on fulfilling GHG reduction commitments and will lead to long-term resource savings. UC Denver is well served to know the sources of emissions, how those emissions can be addressed and reduced and how cost savings can ultimately be realized by investments in reduction measures. This plan also prepares UC Denver for future governmental frameworks that can regulate GHG emissions.

## APPENDIX A1

### Climate Action Plan Glossary of Terms

**American College and University Presidents Climate Commitment** (ACUPCC) is an effort to encourage commitments from institutions of higher learning to neutralize greenhouse gas emissions and prioritize the research and education efforts aimed at stabilizing earth's climate.

**Carbon dioxide** (CO<sub>2</sub>) means the chemical compound containing one atom of carbon and two atoms of oxygen. Excess carbon dioxide in the atmosphere creates a greenhouse effect that can cause the earth's climate to warm.

**Carbon dioxide equivalent** (CO<sub>2</sub>e) represents the quantity of a greenhouse gas multiplied by a factor relative to CO<sub>2</sub>. This is the "standard unit" used to quantify various greenhouse gasses.

**Carbon Neutrality** refers to having a **net zero carbon footprint**, refers to achieving net zero carbon emissions by balancing a measured amount of carbon released with an equivalent amount sequestered or offset.

**Carbon offsets** are reductions of greenhouse gases that can be used to counteract emissions from other activities, measured in metric tonnes of CO<sub>2</sub>e. While similar, carbon offsets are not the same as Renewable Energy Certificates (RECs).

**Emissions Reduction Initiatives** are distinct groups of actions that will reduce or mitigate net emissions. Three are suggested here: conservation and efficiency; renewable energy and fuels; and carbon offsets and renewable energy certificates (RECs)

**Energy Use Intensity** (EUI) is a measure of how much energy is used per square foot in UC Denver buildings, or kBtu/sq. ft.

**Greenhouse gas** (GHG) is any gas that contributes to anthropogenic global warming including, but not limited to, carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride.

**Greenhouse Gas Scopes** are three tiers of GHG gasses that are accounted for in the UC Denver inventory:

- Scope 1 GHG emissions are those directly occurring from sources that are owned or controlled by the UC Denver, including on-campus stationary combustion of fossil fuels and mobile combustion of fossil fuels by fleet vehicles.
- Scope 2 emissions are indirect emissions generated in the production of electricity by Xcel Energy and consumed by the university.
- Scope 3 emissions are all the other indirect emissions that are "a consequence of the activities of the institution, but occur from sources not owned or controlled by the institution" such as commuting, air travel for university activities, waste disposal, etc.

**Leadership in Energy and Environmental Design (LEED)** is a green building rating system of the United States Green Building Council (USGBC) that provides a suite of standards for

## University of Colorado Denver

Anschutz Medical Campus • Denver Campus

environmentally sustainable design. LEED certified buildings use less energy than standard constructed buildings thusly reducing greenhouse gas emissions.

**Metric ton** means one metric tonne (1000 kilograms) or 2204.62 pounds.

**Renewable Energy Certificate (REC)** is a tradable certificate that represents a unit of energy produced by renewable energy sources. Owners of RECs can claim that they are using renewable energy equal to the amount of RECs they own.

**Renewable energy source** means any source of energy that is replenished rapidly by natural processes. Renewable sources include, but are not limited to, wind, solar, hydroelectric, biomass, geothermal, tidal or sea currents, etc.

**Smart Grid** is a next generation electricity transmission and distribution grid that allows for two way communications between electric utilities and consumers in order to save energy, reduce cost and increase reliability and transparency.

**APPENDIX A2**

**D0011 07**

**Executive Order**

**Greening of State Government: Goals and Objectives**

Pursuant to the authority vested in the Office of the Governor of the State of Colorado, I, Bill Ritter, Jr., Governor of the State of Colorado, hereby issue this Executive Order to establish goals and objectives, designed to reduce the environmental impact of state government.

**1. Background and Purpose**

The daily activities of State government have a significant impact on the quality of Colorado's public health, environment and use of its natural resources. This order charges State departments, agencies and offices to take a position of leadership in the new energy economy by reducing state energy consumption, increasing state use of renewable energy sources, increasing the energy efficiency and decreasing the environmental impact of the state vehicle fleet, implementing environmental purchasing standards and requiring attention to energy and environmental impacts of purchasing and materials decisions.

The purpose of this order is to provide clear guidance and directive to all state agencies and offices in the greening of state government in the State of Colorado. This Executive Order applies to all state departments, agencies and offices that report to the Governor. This Executive Order also establishes Greening Government Manager ("Manager") within the Governor's Energy Office ("GEO") to facilitate the goals and objectives within this order.

This Executive Order modifies but does not replace Executive Order D 005 05. The Greening of State Government Coordinating Council ("Council") formed pursuant to Executive Order D 005 05, shall continue under the lead of the GEO. The elements of Executive Order D 005 05 will remain in place and are to be read in conjunction with this Executive Order.

**2. Directive**

**A. Greening Government Manager**

I hereby order the creation of a Greening Government Manager within the GEO. The manager shall facilitate reduction of environmental impacts through implementation of departmental energy plans and will assist state departments and agencies in achieving the goals and objectives of this order and as established by the Council. Working closely with state departments, agencies, and the Council, I direct the Manager to implement a sustainability management system to track energy efficiency, water conservation, recycling, fleet operations, and environmentally preferable purchasing. Working closely with the Department of Personnel and Administration ("DPA") and Department of Public Health and Environment ("DPHE"), the Manager shall also undertake primary coordinating responsibilities for the Council.

## **B. Greening Government Council**

Each Executive Director shall appoint a department or agency representative for participation in the Council as created in Executive Order D 005 05. The Council shall develop the appropriate policies and procedures to implement the goals and objectives of this order, including any exemptions or exceptions to the standards that the Council deems appropriate.

The Council shall prepare an Annual Report Card on the achievements under this order for review and to inform recommendations for additional action by the Governor. The Council shall develop educational materials for state employees on sustainability, stewardship, climate change, and other environmental issues, so that employees better understand the reason for this Executive Order. All agencies and departments shall educate employees regularly using these materials. DPHE shall maintain an environmental outcomes database to track environmental measurements for Greening Government efforts. All state departments shall report to DPHE the measures required for the database.

## **C. Specific Goals and Objectives**

I direct the Manager and Council to work with all state agencies and offices to achieve the goals described below. :

### **i. For Energy Management**

- By fiscal year 2011-2012, achieve at least a 20% reduction in energy consumption of state facilities below fiscal year 2005-2006 levels;
- By January of 2008 develop or update an energy management plan and ensure development of a study determining feasibility of energy performance contracting for all state owned facilities;
- On an ongoing basis, assess and implement where effective, the development of state renewable energy projects with the support of GEO.

### **ii. For materials and resource management:**

- By fiscal year 2008-2009, develop purchasing policies to reduce the state's environmental impact as a consumer of products and services;
- Adopt a goal of "zero waste" from construction of new buildings and operation and renovation of existing facilities;
- Achieve a paper use reduction goal of 20% by fiscal year 2011-2012 using fiscal year 2005-2006 as a baseline;
- Achieve a reduction of water consumption goal of 10% by fiscal year 2011-2012, using fiscal year 2005-2006 as a baseline;
- DPA, in cooperation with DPHE, shall develop purchasing policies for selecting environmentally preferable products.

### **iii. For vehicle petroleum consumption**

- By June 30, 2012, achieve a 25% volumetric reduction in petroleum consumption by state vehicles measured against a fiscal year 2005-2006

baseline, while increasing energy efficiency of the fleet (excluding vehicles used for law enforcement, emergency response, road maintenance, and highway construction).

- By December 1, 2007, complete a transportation efficiency audit addressing methods for improving the environmental efficiency of the state fleet.

### **3. Duration**

This Executive Order shall remain in force until further modification or rescission by the Governor.

GIVEN under my hand and the  
Executive Seal of the State  
of Colorado, this 16th day of

April 2007.  
Bill Ritter, Jr.  
Governor

APPENDIX A3



University of Colorado

Michael Carrigan  
Regent

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555 17<sup>th</sup> Street, Suite 3200  
Denver, CO 80202  
Phone (303) 295-8314  
E-mail: Michael.Carrigan@cu.edu

**TO:** Board of Regents  
**FROM:** Regent Michael Carrigan  
**DATE:** October 26, 2009  
**SUBJECT:** CU Sustainability and Practices

A handwritten signature in black ink, appearing to read "MJC", written over a horizontal line.

**I. REQUEST FOR ACTION BY THE BOARD OF REGENTS**

I recommend that the following resolution be submitted for approval by the Board of Regents on November 12, 2009.

WHEREAS the University of Colorado Board of Regents encourages sustainability efforts on a university-wide basis;

WHEREAS the University of Colorado at Boulder has been recognized as a national leader for its sustainability efforts; and

WHEREAS that the Board of Regents recognizes the leadership of all three chancellors on behalf of their respective campus in sustainability and encourages the university's commitment to the American College and University Presidents' Climate Commitment; and

WHEREAS the mission of the University of Colorado is to contribute to the progress of knowledge and innovation, as well as teaching and conducting research for the sake of improving our world; and

WHEREAS the University of Colorado has a long history of partnering with major government research institutions such as National Renewable Energy Laboratory , National Center for Atmospheric Research , and Cooperative Institute for Research to create solutions to global climate problems; and,

WHEREAS 650 major college and universities around the country have joined the American College and University Presidents' Climate Commitment.

NOW THEREFORE BE IT RESOLVED that the Board of Regents recognizes the significant potential financial and resource savings generated by campus investments in Leadership in Energy and Environmental Design (LEED) standards for buildings on campus and directs the president and chancellors to incorporate LEED standards in university buildings wherever possible;

FURTHER RESOLVED that the Board of Regents directs the president to ensure that the campuses complete the development of their respective comprehensive plans to achieve climate neutrality as outlined in the American College and University Presidents' Climate Commitment by June 30, 2010.

FURTHER RESOLVED that the Board directs the president to work with the chancellors to incorporate into their comprehensive plans the Governor's Colorado Climate Action Plan and the Greening of State Government Executive Orders, to the extent possible in the light of declining state support for the University.

FURTHER RESOLVED that the president and chancellors should report to the Board of Regents on the progress on a bi-annual basis.

## **II. STATEMENT OF INFORMATION**

At the September 16, 2009, Board of Regents Budget and Finance Committee meeting, each campus gave a presentation on its efforts to develop sustainability plans. The campus sustainability plans have been informed by two documents:

- American College and University Presidents Climate Commitment – signed by each campus chancellor in 2007.
- Colorado Climate Action Plan and the Greening of State Government Executive Order – This established 2012 goal for a reduction in energy by 20 percent based upon a FY 2006 baseline.

A presentation by the Intercampus Student Forum Chair, Dustin Farivar, called on the Board of Regents and President Benson to become one of the first statewide systems to formally support the American College and University Presidents' Climate Commitment (ACUPCC). ICSF Chair Farivar and other student leaders presented a resolution for the Board to take a rigorous step forward to co-create CU Sustainability Standards and Practices with students, campus sustainability officers, and members of the university administration.

## **III. PREVIOUS ACTIONS**

None

## APPENDIX A4



University of Colorado Denver

<u>Office of the Chancellor</u>	<u>Denver Campus</u>	<u>Anschutz Medical Campus</u>
	Campus Box 168 P.O. Box 173364 Denver, Colorado 80217-3364 Phone: 303-315-2500 Fax: 303-315-2877	Campus Box A005-168 13001 East 17 <sup>th</sup> Place Aurora, Colorado 80045 Phone: 303-315-2500 Fax: 303-315-2877

A charge establishing

## The Chancellor's Taskforce on Sustainability

### Statement of Purpose

The Chancellor's Taskforce on Sustainability shall serve as the University of Colorado Denver's primary visioning body for both long-term and short-term sustainability initiatives on both the Downtown Denver Campus and the Anschutz Medical Campus.

### Charge

The Chancellor's Taskforce on Sustainability is charged with developing both long-term and short-term sustainability goals and initiatives to be implemented across the entirety of the University of Colorado Denver where appropriate or within individual schools, colleges, divisions, departments and units. These initiatives should, among other goals, assist the university in meeting its aspirations and obligations under Gov. Bill Ritter's Greening of State Government executive orders as well as the American College and University Presidents' Climate Commitment and the University of Colorado Denver's 2020 Strategic Plan. The taskforce shall engage across units at UC Denver and outside of UC Denver to collaboratively develop initiatives that include a spectrum of effort from small, low cost initiatives to larger, higher cost long-term initiatives. In meeting this charge in a climate of fiscal constraint, the taskforce shall explore innovative ways in which to leverage resources and expertise toward accomplishing sustainability goals.

### Background

The University of Colorado Denver has long held sustainability as a value to be pursued whenever possible. This belief led the university to couple its internal sustainability initiatives with outward public actions aimed at translating its beliefs into action in our community. Those public actions include:

- The University of Colorado Denver supported Gov. Bill Ritter’s 2007 signing of the Greening of State Government Executive Orders. These orders established goals for reducing energy consumption in state facilities and fleets and for using efficient materials and resources in construction. The Executive Orders also laid out tangible goals to be reached by 2012.
- The University of Colorado Denver was a signatory in 2007 on the American College and University Presidents’ Climate Commitment which acknowledges the need for colleges and universities to lead the way in creating more sustainable communities. This commitment sets out specific goals and timelines for completion of initiatives.
- The University of Colorado Denver community in 2008 acknowledged the need for sustainability efforts when it developed its 2020 Strategic Plan, which includes among other strategic priorities the need to “secure the resources to achieve our vision, while being responsible stewards of those resources.”

### **Summary of Taskforce Governance Structure**

*Membership:* The Chancellor’s Taskforce on Sustainability shall draw its membership from across the university community, but shall always include individuals from key constituencies including faculty and students as well as individuals with expertise in the areas required for the taskforce’s work including sustainability, transportation, utilities and facilities.

*Service:* Terms of service on the taskforce shall be two years, and individuals shall be allowed to serve multiple consecutive terms.

*Appointments:* Individuals shall be appointed to the taskforce by the Vice Chancellor for Administration and Finance and the Provost.

*Governance Structure:* The taskforce shall be chaired by the Assistant Vice Chancellor for Facilities. Subcommittees shall be formed as necessary for the purpose of developing recommendations for consideration by the full membership of the taskforce. Subcommittees may include individuals who are not members of the taskforce. The Assistance Vice Chancellor for Facilities shall be responsible for maintaining a sustainability website for UC Denver.

*Annual Report:* The taskforce shall present annually to the Chancellor a report updated the sustainability goals. The report shall also contain progress on initiatives from the previous year and proposed initiatives for the current year. This report should include all initiatives from across the spectrum of effort and should also detail new or enhanced university partnerships aimed at leveraging resources.

## University of Colorado Denver

Anschutz Medical Campus • Denver Campus

*Procedures:* The taskforce will meet at least quarterly. A formal agenda shall be prepared for each meeting. Minutes that include attendance shall be taken for each meeting and shall be formally approved by the taskforce members. The taskforce shall approve the annual report by majority vote of the taskforce members in attendance at a meeting of the taskforce.

APPENDIX A5

Campus Energy Efficiency Projects

Building 500

Evaporative cooling; occupancy sensors; HVAC controls

<u>Annual Energy Consumption</u>	Electric	Steam	Chilled Water		<b>Total</b>	
Utility Consumption	8,000,000	37,000	2,000,000			
Utility Unit Rate	\$0.075	\$18.00	\$0.22			
Utility Cost	\$600,000	\$666,000	\$440,000	\$	<b>\$1,706,000</b>	
CO <sub>2</sub> e	6,400	2,072	1,120	M-T	<b>9,592</b>	
Building GSF				GSF	<b>483,291</b>	
Building EUI	56	77	50	kBTU/GSF	<b>183</b>	
<u>Annual Energy Savings</u>	5%	25%	15%			
Consumption Savings	400,000	9,250	300,000			
Utility Unit Rate	\$0.075	\$18.00	\$0.22			
Cost Savings	\$30,000	\$166,500	\$66,000	\$	<b>\$262,500</b>	
<u>Cost Payback</u>						
Est. Cost				\$	<b>\$9,500,000</b>	
Simple Payback				Years	<b>36.19</b>	
<u>Annual GHG Savings</u>						
CO <sub>2</sub> e Reduction	320	518	168	M-T	<b>1,006</b>	10%
New Building CO <sub>2</sub> e	6,080	1,554	952	M-T	<b>8,586</b>	
New Building EUI	54	57	42	kBTU/GSF	<b>153</b>	16%
CO <sub>2</sub> e Reduction/\$				kg/\$	<b>0.11</b>	
<u>UCD Baseline</u>						
FY06 Building Sector CO <sub>2</sub> e				M-T	<b>112,039</b>	
FY06 EUI				kBTU/GSF	<b>303</b>	
<u>UCD Baseline Savings</u>						
CO <sub>2</sub> e					<b>0.90%</b>	
EUI					<b>10%</b>	

APPENDIX A5 Continued

RC1

Evaporative cooling; occupancy sensors; HVAC controls

<u>Annual Energy Consumption</u>					<b>Total</b>
	Electric	Steam	Chilled Water		
Utility Consumption	23,000,000	115,000	5,000,000		
Utility Unit Rate	\$0.075	\$18.00	\$0.22		
Utility Cost	\$1,725,000	\$2,070,000	\$1,100,000	\$	<b>\$4,895,000</b>
CO <sub>2</sub> e	18,400	6,440	2,800	M-T	<b>27,640</b>
Building GSF				GSF	<b>622,600</b>
Building EUI	126	185	96	kBTU/GSF	<b>407</b>
<u>Annual Energy Savings</u>					
	6%	27%	46%		
Consumption Savings	1,283,539	31,618	2,288,817		
Utility Unit Rate	\$0.075	\$18.00	\$0.22		
Cost Savings	\$96,265	\$569,124	\$503,540	\$	<b>\$1,168,929</b>
<u>Cost Payback</u>					
Est. Cost				\$	<b>\$11,851,000</b>
Simple Payback				Years	<b>10.14</b>
<u>Annual GHG Savings</u>					
CO <sub>2</sub> e Reduction	1,027	1,771	1,282	M-T	<b>4,079</b> 15%
New Building CO <sub>2</sub> e	17,373	4,669	1,518	M-T	<b>23,561</b>
New Building EUI	119	134	52	kBTU/GSF	<b>305</b> 25%
CO <sub>2</sub> e Reduction/\$				kg/\$	<b>0.34</b>
<u>UCD Baseline</u>					
FY06 Building Sector					
CO <sub>2</sub> e				M-T	<b>112,039</b>
FY06 EUI				kBTU/GSF	<b>303</b>
<u>UCD Baseline Savings</u>					
CO <sub>2</sub> e					<b>3.64%</b>
EUI					<b>34%</b>

APPENDIX A5 Continued

Henderson Parking Structure  
Relamp w/ energy efficient lighting

<u>Annual Energy Consumption</u>	Electric	Steam	Chilled Water		<b>Total</b>
Utility Consumption	850,000	0	0		
Utility Unit Rate	\$0.075	\$18.00	\$0.22		
Utility Cost	\$63,750	\$0	\$0	\$	<b>\$63,750</b>
CO <sub>2</sub> e	680	0	0	M-T	<b>680</b>
Building GSF				GSF	<b>521,000</b>
Building EUI	6	0	0	kBTU/GSF	<b>6</b>
<u>Annual Energy Savings</u>	35%	0%	0%		
Consumption Savings	295,000	0	0		
Utility Unit Rate	\$0.075	\$18.00	\$0.22		
Cost Savings	\$22,125	\$0	\$0	\$	<b>\$22,125</b>
<u>Cost Payback</u>					
Est. Cost				\$	<b>\$134,212</b>
Est. Xcel Rebate				\$	<b>\$13,783</b>
Simple Payback				Years	<b>5.44</b>
<u>Annual GHG Savings</u>					
CO <sub>2</sub> e Reduction	236	0	0	M-T	<b>236</b> 35%
New Building CO <sub>2</sub> e	444	0	0	M-T	<b>444</b>
New Building EUI	4	0	0	kBTU/GSF	<b>4</b> 35%
CO <sub>2</sub> e Reduction/\$				kg/\$	<b>1.76</b>
<u>UCD Baseline</u>					
FY06 Building Sector CO <sub>2</sub> e				M-T	<b>112,039</b>
FY06 EUI				kBTU/GSF	<b>303</b>
<u>UCD Baseline Savings</u>					
CO <sub>2</sub> e					<b>0.21%</b>
EUI					<b>1%</b>

APPENDIX A5 Continued

CUP

Relamp w/ energy efficient lighting, OCC sensors

<u>Annual Energy Consumption</u>	Electric	Steam	Chilled Water		<b>Total</b>
Utility Consumption	1,554,000	0	0		
Utility Unit Rate	\$0.075	\$18.00	\$0.22		
Utility Cost	\$116,550	\$0	\$0	\$	<b>\$116,550</b>
CO <sub>2</sub> e	1,243	0	0	M-T	<b>1,243</b>
<u>Annual Energy Savings</u>	12%	0%	0%		
Consumption Savings	189,612	0	0		
Utility Unit Rate	\$0.075	\$18.00	\$0.22		
Cost Savings	\$14,221	\$0	\$0	\$	<b>\$14,221</b>
<u>Cost Payback</u>					
Est. Cost				\$	<b>\$16,389</b>
Est. Xcel Rebate				\$	<b>\$4,450</b>
Simple Payback				Years	<b>0.84</b>
<u>Annual GHG Savings</u>					
CO <sub>2</sub> e Reduction	152	0	0	M-T	<b>152</b> 12%
New Building CO <sub>2</sub> e	1,092	0	0	M-T	<b>1,092</b>
CO <sub>2</sub> e Reduction/\$				kg/\$	<b>9.26</b>
<u>UCD Baseline</u>					
FY06 Building Sector CO <sub>2</sub> e				M-T	<b>112,039</b>
FY06 EUI				kBTU/GSF	<b>303</b>
<u>UCD Baseline Savings</u>					
CO <sub>2</sub> e					<b>0.14%</b>

APPENDIX A5 Continued

EH&S

Relamp/Occupancy Sensors

<u>Annual Energy Consumption</u>	Electric	Steam	Chilled Water		<b>Total</b>
Utility Consumption	524,400	4,901	163,221		
Utility Unit Rate	\$0.075	\$18.00	\$0.22		
Utility Cost	\$39,330	\$88,218	\$35,909	\$	<b>\$163,457</b>
CO <sub>2</sub> e	420	274	91	M-T	<b>785</b>
Building GSF				GSF	<b>21,002</b>
Building EUI	85	233	93	kBTU/GSF	<b>412</b>
<u>Annual Energy Savings</u>	3%	0%	0%		
Consumption Savings	15,732	0	0		
Utility Unit Rate	\$0.075	\$18.00	\$0.22		
Cost Savings	\$1,180	\$0	\$0	\$	<b>\$1,180</b>
<u>Cost Payback</u>					
Est. Cost				\$	<b>\$10,000</b>
Est. Xcel Rebate				\$	<b>\$6,885</b>
Simple Payback				Years	<b>2.64</b>
<u>Annual GHG Savings</u>					
CO <sub>2</sub> e Reduction	13	0	0	M-T	<b>13</b> 2%
New Building CO <sub>2</sub> e	407	274	91	M-T	<b>773</b>
New Building EUI	83	233	93	kBTU/GSF	<b>409</b> 1%
CO <sub>2</sub> e Reduction/\$				kg/\$	<b>1.26</b>
<u>UCD Baseline</u>					
FY06 Building Sector CO <sub>2</sub> e				M-T	<b>112,039</b>
FY06 EUI				kBTU/GSF	<b>303</b>
<u>UCD Baseline Savings</u>					
CO <sub>2</sub> e					<b>0.01%</b>
EUI					<b>1%</b>

APPENDIX A5 Continued

EH&S

Heat Recovery/Evap Cooling

<u>Annual Energy Consumption</u>	Electric	Steam	Chilled Water		<b>Total</b>
Utility Consumption	524,400	4,901	163,221		
Utility Unit Rate	\$0.075	\$18.00	\$0.22		
Utility Cost	\$39,330	\$88,218	\$35,909	\$	<b>\$163,457</b>
CO <sub>2</sub> e	420	274	91	M-T	<b>785</b>
Building GSF				GSF	<b>21,002</b>
Building EUI	85	233	93	kBTU/GSF	<b>412</b>
 <u>Annual Energy Savings</u>	5%	25%	25%		
Consumption Savings	26,220	1,225	40,805		
Utility Unit Rate	\$0.075	\$18.00	\$0.22		
Cost Savings	\$1,967	\$22,055	\$8,977	\$	<b>\$32,998</b>
 <u>Cost Payback</u>					
Est. Cost				\$	<b>\$750,000</b>
Simple Payback				Years	<b>22.73</b>
 <u>Annual GHG Savings</u>					
CO <sub>2</sub> e Reduction	21	69	23	M-T	<b>112</b> 14%
New Building CO <sub>2</sub> e	399	206	69	M-T	<b>673</b>
New Building EUI	81	175	70	kBTU/GSF	<b>326</b> 21%
CO <sub>2</sub> e Reduction/\$				kg/\$	<b>0.15</b>
 <u>UCD Baseline</u>					
FY06 Building Sector CO <sub>2</sub> e				M-T	<b>112,039</b>
FY06 EUI				kBTU/GSF	<b>303</b>
 <u>UCD Baseline Savings</u>					
CO <sub>2</sub> e					<b>0.10%</b>
EUI					<b>28%</b>

APPENDIX A5 Continued

BDC

Evaporative cooling; occupancy sensors; HVAC controls

<u>Annual Energy Consumption</u>	Electric	Steam	Chilled Water		<b>Total</b>	
Utility Consumption	3,328,500	10,971	561,987			
Utility Unit Rate	\$0.075	\$18.00	\$0.22			
Utility Cost	\$249,638	\$197,478	\$123,637	\$	<b>\$570,753</b>	
CO <sub>2</sub> e	2,663	614	315	M-T	<b>3,592</b>	
Building GSF				GSF	<b>112,000</b>	
Building EUI	101	98	60	kBTU/GSF	<b>260</b>	
 <u>Annual Energy Savings</u>	5%	15%	20%			
Consumption Savings	166,425	1,646	112,397			
Utility Unit Rate	\$0.075	\$18.00	\$0.22			
Cost Savings	\$12,482	\$29,622	\$24,727	\$	<b>\$66,831</b>	
 <u>Cost Payback</u>						
Est. Cost				\$	<b>\$1,000,000</b>	
Simple Payback				Years	<b>14.96</b>	
 <u>Annual GHG Savings</u>						
CO <sub>2</sub> e Reduction	133	92	63	M-T	<b>288</b>	8%
New Building CO <sub>2</sub> e	2,530	522	252	M-T	<b>3,304</b>	
New Building EUI	96	83	48	kBTU/GSF	<b>228</b>	12%
CO <sub>2</sub> e Reduction/\$				kg/\$	<b>0.29</b>	
 <u>UCD Baseline</u>						
FY06 Building Sector						
CO <sub>2</sub> e				M-T	<b>112,039</b>	
FY06 EUI				kBTU/GSF	<b>303</b>	
 <u>UCD Baseline Savings</u>						
CO <sub>2</sub> e					<b>0.26%</b>	
EUI					<b>10%</b>	

APPENDIX A5 Continued

School of Dental Medicine

Evaporative cooling; occupancy sensors; HVAC controls

<u>Annual Energy Consumption</u>					<b>Total</b>
	Electric	Steam	Chilled Water		
Utility Consumption	2,144,100	6,595	406,226		
Utility Unit Rate	\$0.075	\$18.00	\$0.22		
Utility Cost	\$160,808	\$118,710	\$89,370	\$	<b>\$368,887</b>
CO <sub>2</sub> e	1,715	369	227	M-T	<b>2,312</b>
Building GSF				GSF	<b>95,448</b>
Building EUI	77	69	51	kBTU/GSF	<b>197</b>
<u>Annual Energy Savings</u>					
	5%	10%	10%		
Consumption Savings	107,205	660	40,623		
Utility Unit Rate	\$0.075	\$18.00	\$0.22		
Cost Savings	\$8,040	\$11,871	\$8,937	\$	<b>\$28,848</b>
<u>Cost Payback</u>					
Est. Cost				\$	<b>\$1,000,000</b>
Simple Payback				Years	<b>34.66</b>
<u>Annual GHG Savings</u>					
CO <sub>2</sub> e Reduction	86	37	23	M-T	<b>145</b> 6%
New Building CO <sub>2</sub> e	1,630	332	205	M-T	<b>2,167</b>
New Building EUI	73	62	46	kBTU/GSF	<b>181</b> 8%
CO <sub>2</sub> e Reduction/\$				kg/\$	<b>0.15</b>
<u>UCD Baseline</u>					
FY06 Building Sector					
CO <sub>2</sub> e				M-T	<b>112,039</b>
FY06 EUI				kBTU/GSF	<b>303</b>
<u>UCD Baseline Savings</u>					
CO <sub>2</sub> e					<b>0.13%</b>
EUI					<b>5%</b>

APPENDIX A5 Continued

PRF

Evaporative cooling; occupancy sensors; HVAC controls; replace air cooled chillers

<u>Annual Energy Consumption</u>	Electric	Nat Gas	Chilled Water		<b>Total</b>
Utility Consumption	1,500,000	8,676			
Utility Unit Rate	\$0.085	\$8.00			
Utility Cost	\$127,500	\$69,408		\$	<b>\$196,908</b>
CO <sub>2</sub> e	1,200	486		M-T	<b>1,686</b>
Building GSF				GSF	<b>31,110</b>
Building EUI	165	279		kBTU/GSF	<b>443</b>
<u>Annual Energy Savings</u>	25%	25%			
Consumption Savings	375,000	2,169			
Utility Unit Rate	\$0.085	\$8.00			
Cost Savings	\$31,875	\$17,352		\$	<b>\$49,227</b>
<u>Cost Payback</u>					
Est. Cost				\$	<b>\$2,025,000</b>
Simple Payback				Years	<b>41.14</b>
<u>Annual GHG Savings</u>					
CO <sub>2</sub> e Reduction	300	121		M-T	<b>421</b> 25%
New Building CO <sub>2</sub> e	900	364		M-T	<b>1,264</b>
New Building EUI	123	209		kBTU/GSF	<b>333</b> 25%
CO <sub>2</sub> e Reduction/\$				kg/\$	<b>0.21</b>
<u>UCD Baseline</u>					
FY06 Building Sector CO <sub>2</sub> e				M-T	<b>112,039</b>
FY06 EUI				kBTU/GSF	<b>303</b>
<u>UCD Baseline Savings</u>					
CO <sub>2</sub> e					<b>0.38%</b>
EUI					<b>37%</b>

APPENDIX 5A Continued

CU Building  
New Building Control  
System

<u>Annual Energy Consumption</u>	Electric	Steam	Chilled Water		<b>Total</b>
Utility Consumption	3,100,000	6,640			
Utility Unit Rate	\$0.085	\$21.00			
Utility Cost	\$263,500	\$139,440		\$	<b>\$402,940</b>
CO <sub>2</sub> e	2,480	372		M-T	<b>2,852</b>
Building GSF				GSF	<b>159,573</b>
Building EUI	66	42		kBTU/GSF	<b>108</b>
<u>Annual Energy Savings</u>	5%	25%			
Consumption Savings	155,000	1,660			
Utility Unit Rate	\$0.085	\$21.00			
Cost Savings	\$13,175	\$34,860		\$	<b>\$48,035</b>
<u>Cost Payback</u>					
Est. Cost				\$	<b>\$1,500,000</b>
Simple Payback				Years	<b>31.23</b>
<u>Annual GHG Savings</u>					
CO <sub>2</sub> e Reduction	124	93		M-T	<b>217</b> 8%
New Building CO <sub>2</sub> e	2,356	279		M-T	<b>2,635</b>
New Building EUI	63	31		kBTU/GSF	<b>94</b> 13%
CO <sub>2</sub> e Reduction/\$				kg/\$	<b>0.14</b>
<u>UCD Baseline</u>					
FY06 Building Sector					
CO <sub>2</sub> e				M-T	<b>112,039</b>
FY06 EUI				kBTU/GSF	<b>303</b>
<u>UCD Baseline Savings</u>					
CO <sub>2</sub> e					<b>0.19%</b>
EUI					<b>5%</b>

APPENDIX 5A Continued

LSC  
VAV Terminal and new  
controls; new fan coils

<u>Annual Energy Consumption</u>	Electric	Nat Gas	Chilled Water		<b>Total</b>
Utility Consumption	2,100,000	6,400			
Utility Unit Rate	\$0.085	\$8.00			
Utility Cost	\$178,500	\$51,200		\$	<b>\$229,700</b>
CO <sub>2</sub> e	1,680	358		M-T	<b>2,038</b>
Building GSF				GSF	<b>189,809</b>
Building EUI	38	34		kBTU/GSF	<b>71</b>
<u>Annual Energy Savings</u>	5%	15%			
Consumption Savings	105,000	960			
Utility Unit Rate	\$0.085	\$8.00			
Cost Savings	\$8,925	\$7,680		\$	<b>\$16,605</b>
<u>Cost Payback</u>					
Est. Cost				\$	<b>\$1,000,000</b>
Simple Payback				Years	<b>60.22</b>
<u>Annual GHG Savings</u>					
CO <sub>2</sub> e Reduction	84	54		M-T	<b>138</b> 7%
New Building CO <sub>2</sub> e	1,596	305		M-T	<b>1,901</b>
New Building EUI	36	29		kBTU/GSF	<b>65</b> 10%
CO <sub>2</sub> e Reduction/\$				kg/\$	<b>0.14</b>
<u>UCD Baseline</u>					
FY06 Building Sector CO <sub>2</sub> e				M-T	<b>112,039</b>
FY06 EUI				kBTU/GSF	<b>303</b>
<u>UCD Baseline Savings</u>					
CO <sub>2</sub> e					<b>0.12%</b>
EUI					<b>2%</b>

**APPENDIX A6**

**Complete Sustainability Course Listings**

**College of Architecture and Planning**

**Master's in Urban and Regional Planning, Concentration: Land Use and Environmental Planning**

This MURP concentration prepares students for making and administering plans and policies at all levels including neighborhood, city, watershed and region. Land use and environmental planning emphasizes regulation of land uses and development processes, organization of transportation infrastructure and other major public investments, and management of urban ecology, environmental quality and natural resources

Faculty: Concentration Coordinator: Dr. Brian Muller

**Colorado Center for Sustainable Urbanism**

The center examines one of Colorado's most urgent challenges—creating livable communities in the context of a booming population. This center studies growth-oriented issues, disseminates information, tests growth scenarios and provides expertise to cities and organizations involved in growth-related issues.

Faculty: Dr. Thomas Clark, Director

**Colorado Center for Community Development**

The Colorado Center for Community Development assists organizations, communities, and neighborhoods which cannot afford or do not have access to such technical or educational assistance. The efforts of the Center are focused primarily on rural towns, low-income communities, and development organizations.

Faculty: Judith Bergquist, Associate Director, Denver office; Thomas Clark, Director

**Children, Youth, and Environments Center for Research and Design**

The Children, Youth and Environments Center for Research and Design works with the design professions and allied disciplines to contribute to the health, safety and welfare of children and youth. The Center undertakes and supports interdisciplinary activities in research, policy and practice, while recognizing young people's capacity for meaningful participation in the processes that shape their lives. It focuses in particular on children and youth in environments of disadvantage and those with special needs.

Faculty: Lois Brink, Director Learning Landscapes; Rachel Cleaves, Associate Director Learning Landscapes

**Business School**

**MBA, Managing for Sustainability Specialization**

Provides business students with an understanding of the business issues associated with managing for sustainable growth including issues facing businesses in a world where resources are scarce, social safety nets are declining, and customers and

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commentators are concerned about companies behaving in an ethical and responsible manner. Approaches alternative ways to reduce the negative impact of economic activities through environmental finance and accounting, corporate social responsibility, social entrepreneurship, and social marketing. Examines the role business has in fostering the long-term health and viability of communities, the environment and the company.

Faculty: Ken Bettenhausen, Elizabeth Cooperman, Co-Directors; John Byrd, Coordinator

### MS in Global Energy Management (GEM)

Students gain a leadership and business education focused solely on the energy industry. Developed in partnership with leading energy companies, the curriculum addresses the practical, real world considerations and challenges energy companies face on a daily basis. GEM is designed to equip future leaders with the tools needed to find solutions to the issues and opportunities found in conventional (oil, gas, coal), nonconventional (oil sands, shale), alternative (nuclear, coal gasification) and renewable (solar, wind, bio-fuels, etc.) energy businesses. This real-world curriculum is taught by faculty members from around the world who have extensive experience in the energy industry.

Faculty: John Turner, Executive Director, Global Energy Management Program

### Bard Center for Entrepreneurship/ Certificate in Entrepreneurial Studies

Established in 1996 as part of the Business School, the Bard Center offers graduate level entrepreneurship courses that can be applied toward a graduate business degree or a Certificate in Entrepreneurship. The Bard Center also hosts an annual business plan competition, manages a venture capital fund to help launch student-initiated ventures and offers incubator space to emerging businesses.

Faculty: Catherine Kunst, Ph.D. Bard Center for Entrepreneurship, Executive Director; Tiffany Espinoza, Innovation in the Social Sector

## College of Engineering and Applied Science

### Department of Civil Engineering

Program: MS, Environmental and Sustainability Engineering and MEng, Sustainable Infrastructure

Faculty: Assistant Professors Arunprakash Karunanithi, PhD, David C. Mays, PhD, PE, and Zhiyong (Jason) Ren, PhD; Anu Ramaswami, PhD Professor

### The Center for Geotechnical Engineering Science

Advances the understanding of the safety, reliability, performance, and environmental impact of engineered geostuctures. The Center also examines geostuctural stability, rock engineering, geoenvironmental engineering, and expansive soils.

Faculty: N.Y. Chang

### The Transportation Research Center

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Seeks to address local, state, national, and international concerns in all areas of 21st century transportation. The Center works in collaboration with other colleges and businesses, and has established several partnerships with Colorado's high-tech industry.

Faculty: Dr. Bruce Janson

### The IGERT Center for Sustainable Urban Infrastructure

UC Denver received a prestigious \$3.2M Integrative Graduate Education and Research Traineeship (IGERT) grant from the National Science Foundation to develop an innovative inter-disciplinary graduate program on sustainable urban infrastructure. The award supports 26 doctoral students during the five-year grant period from 2007-2012. The graduate program, the first of its kind in the country for its breadth across disciplines, spans the Colleges of Engineering, Architecture and Planning, Public Affairs, and Liberal Arts and Sciences.

### College of Liberal Arts and Sciences

#### Sustainability Undergraduate Minor

Sustainability as one of the CLAS approved Signature Areas has participation from most of the departments in the College contributing expertise of faculty to the interdisciplinary integration of scientific principles, historic trends, philosophic theories and cultural forces that frame the socio-economic and ecological issues in the study of sustainability.

Faculty: Planning Group:

Steve Koester, Ph.D. - Director, Minor in Sustainability, Professor and Chair, Dept. of Anthropology

John Brett, Ph.D. Assistant Professor, Dept. of Anthropology

Deborah Thomas, Ph.D. Associate Professor, Dept. of Geography & Environmental Sciences

Rafael Moreno-Sanchez, Ph.D. Assistant Professor, Dept. of Geography and Environmental Sciences

Jim Igoe, Ph.D. Assistant Professor, Dept. of Anthropology

Charles Musiba, Ph.D. Assistant Professor, Dept. of Anthropology

Jana Everett, Ph.D. Professor and Chair, Dept. of Political Sciences

Brian Page, Ph.D. Associate Professor and Chair, Dept. of Geography and

Environmental Sciences Myra Rich, Ph.D. Associate Professor and Chair, Dept. of History

Greg Cronin, Ph.D. Associate Professor, Dept. of Biology

Steve Beckman, Ph.D. Associate Professor, Dept. of Economics

#### Social Justice, Civic Engagement and Critical Consumption signature area

Social Justice's interdisciplinary theme empowers students to acquire the intellectual tools and moral commitment to participate effectively and responsibly in the world.

Engaging topics such as democracy, education, consumerism, media, race, class, and gender, students acquire the intellectual tools to investigate, and the practical knowledge to affect, how these systems, practices, and identities actually interact in our dynamic world. In the classroom and in service to the community, students thereby gain

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the ability to face 21st century challenges with intelligence and moral courage.

Faculty:

Chad Kautzer , Ph.D. (primary contact) Assistant Professor, Dept. of Philosophy,

Catherine Wiley, Ph.D., Associate Professor, Department of English

Jana Everett, Ph.D., Professor and Chair, Dept. of Political Science

David Hildebrand , Ph.D., Associate Professor, Dept. of Philosophy,

Barbara Walkosz, Ph.D., Associate Professor, Dept. of Communication

Lucy McGuffey, Ph.D., Senior Instructor, Dept. of Political Science

Christopher Agee, Ph.D., Assistant Professor, Dept. of History

Candan Duran-Aydintug, Ph.D., Associate Professor, Department of Sociology

Myra Bookman, Ph.D., Director, Master of Humanities, Master of Social Science

Nancy Ciccone, Ph.D., Assoc Professor and Chair, Dept. of English

Donna Langston, Ph.D., Professor and Director, Ethnic Studies

### MS Social Sciences Degree: Society & the Environment Option

Society and the Environment is an interdisciplinary option for completing the Master of Social Science that emphasizes the human side of environmental issues, while also emphasizing that human issues are never separate from issues of ecology. It challenges students to apply knowledge from the social and biological sciences to environmental problems across a broad spectrum of institutional sectors and geographic locations. Applications include environmental hazards and disasters, environmental impact assessment, protected area management and interpretation, collaborative conservation, ecoregion conservation, conservation policy, and international development.

Faculty: Advisors:

Anthropology: Jim Igoe, John Brett, Steve Koester

Geography: Brian Page, Deborah Thomas

Political Science: Anna Sampaio

### International Studies BA, Concentration in Economics, Development and Environment

Students taking this concentration will develop an understanding of economic processes in an international context. The courses offer comparative approaches and cultural perspectives on development and environment. Students will gain an understanding of economic principles and the social science skills needed to understand the multiple policy choices facing world leaders and local actors.

Faculty: Christoph H. Stefes

Program Director

Colorado International Forum, student organization

### Department of Anthropology

#### Sustainable Development and Political Ecology Concentration

This concentration provides a critical perspective to issues of development and resource conservation, multi-cultural and multi-disciplinary perspectives. A particular strength of this program is the integration of theoretical knowledge with field-based training opportunities. Three major themes are addressed within this concentration: the types of resource management systems that exist around the world and their

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relationship to particular ecosystems; the types of knowledge systems and ideas that are associated with this diverse array of resource management systems ; and the culture of the global and local institutions – from small-scale NGOs to the World Bank – that design and implement conservation and development. A central goal of this emphasis is to help students imagine careers in conservation and/or development, and to provide them with information, opportunities, and resources to pursue a wide variety of career options.

Faculty: Steve Koester, Advisor

### Department of Integrative Biology

#### Graduate studies in Ecology

The Department of Integrative Biology master's in science program offers two tracks: the coursework (non-research) M.S. track or the thesis (research) M.S. Track. Either track is available to students in nine specialty areas, including ecology.

Faculty: Dr. Timberley Roane, Associate Chair for Graduate Studies in Biology

### Department of Chemistry

Coursework: Environmental Chemistry

Faculty Research: Professor John Lanning, PhD; Assistant Professor Yong Liu, PhD

### Department of Communication

Coursework: Environmental Communication

Faculty: Larry Erbert

### Department of Economics

Coursework: Economics of Natural Resources, Environmental Economics, Economic Development: Theory and Problem

### Department of Geography and Environmental Sciences

#### B.A. in Geography

Five options:

General Geography; Environmental Science; Environmental Studies; Urban Studies; or Earth Science.

Undergraduate minors: Environmental Sciences (Advisor: Jon Barbour), Geography, Geology (Advisor: Ryan Sincavage), and Urban and Regional Planning (Advisors: Brian Page or Amanda Weaver).

Certificates: GISci (Advisor: Rafael Moreno) and Environmental Sciences (Air Quality

Option: Larry Anderson, Advisor; Environmental Health Option: Deborah Thomas, Advisor; Ecosystems Option: Greg Cronin, Advisor; Hazardous Waste Option: Anu Ramaswami, Advisor; Water Quality Option: John Lanning, Advisor; Geospatial Analysis Option: Rafael Moreno, Advisor).

### Center for Environmental Sciences

The Center for Environmental Sciences was founded to promote disciplinary and interdisciplinary research in a wide array of areas within the environmental sciences.

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Services provided by the Center are available to all members of the University community, as well as to members of the public and private sectors through joint partnerships.

Faculty: Larry Anderson

### M.S. Environmental Sciences

The M.S. in Environmental Science is an interdisciplinary science degree that prepares students for a job in the environmental field and has six options:

Air Quality; Water Quality; Environmental Health; Hazardous Waste; Geospatial Analysis; and Ecosystems.

Faculty: Jon Barbour, Associate Director; John Wyckoff, Director

### Department of History

Coursework: Environmental history, commodities and globalization

Faculty: Larry Anderson

### Department of Philosophy

Coursework: Environmental Ethics

Faculty: Maria Talero

### Center for Ethics and Community

The Center for Ethics and Community seeks to strengthen ethics in schools, the community, universities, and all professions. Certificate programs are available to members of the UC Denver community, as well as individuals outside the University.

Faculty: Candice Shelby, Ph.D.

### Department of Political Science

Coursework: Political Science: Global Ecological Crises, Environmental Politics and Policy, Global Political Economy I & II,

Faculty: Harvey Bishop, Instructor, The Urban Citizen Program; Tony Robinson, Associate Professor, Geographic Information Systems in Political Science

### Fourth World Center for the Study of Indigenous Law and Politics

This Center provides resources and services that focus on the legal and political issues faced by indigenous populations. The Center features a library, periodicals, audio and visual equipment, and newsfile archives on current development issues surrounding "the Fourth World," and will soon offer a certificate program in this area.

Faculty: Glenn Morris

### The Center for New Directions In Politics and Public Policy

Offers a Master's Degree, undergraduate courses, and a Leadership Certificate focused in the areas of politics and public policy development. All of the programs and the courses help students develop the political acumen necessary for being effective leaders and agents of change in neighborhoods, communities, governmental jurisdictions, and nonprofit entities.

Faculty: Kathryn Cheever, Director

Department of Physics

Coursework: Energy and the Environment

Department of Ethnic Studies

Program: Ethnic Studies Minor/Certificate in Cultural Diversity Studies

Helps students develop a breadth and depth of understanding of ethnicity and its significance in contemporary American society. Presents the ethnic experience from an interdisciplinary perspective, providing a background in the theories and concepts required to understand and interpret inter- and intra-group relations in the United States. The Ethnic Studies minor focuses on the history, culture, and contemporary situation of Asian Americans, African Americans, Latinos, and American Indians.

Faculty: Dr. Donna Langston, Chair and Professor

**School of Public Affairs**

MPA Concentration/Graduate Certificate: Environmental Policy, Management and Law

The Environmental Policy, Management, and Law (EPML) program provides qualified applicants with an understanding of how the environment is affected by relationships between various entities, including legislatures; administrative agencies; courts; federal, state, and local governments; government and the nonprofit and private sectors; and government and the public it has been established to serve. Offered by the School of Public Affairs, University of Colorado Denver, the EPML program can be taken as either a stand-alone graduate certification program or as an emphasis area within the school's Master of Public Administration curriculum.

Faculty: Dr. Lloyd Burton, Dr. George Busenberg

Wirth Chair in Environmental and Community Development Policy

The Wirth Chair in Environmental and Community Development Policy honors the environmental and sustainable development achievements of former Senator and Undersecretary of State Timothy E. Wirth. The Wirth Chair is committed to helping governments, businesses, non-profit groups and community organizations form sustainable development partnerships that carefully balance economic, environmental and expanded social welfare objectives and strategies. The mission of the Wirth Chair is to foster effective sustainable development strategies that will strive to meet the needs of the present without compromising the ability of future generations to meet their own needs. The Wirth Chair works to develop: meaningful environmental protection policies and programs; cost-effective energy management and energy efficiency programs; sound greenhouse gas emission reduction strategies; and fair and effective growth management strategies.

Faculty: Senator Gary Hart, Wirth Chair Professor; Dean Kathleen Beatty, Executive Director

**Colorado School of Public Health**

Department of Community & Behavioral Health

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Community & behavioral health merges the fields of sociology, psychology, anthropology and epidemiology to assess community needs and develop programs and policies that promote health, prevent disease and enhance quality of life. Research and degree programs emphasize community involvement and collaboration along with scientific evidence to understand and influence health and well-being as well as tools to educate for healthy living.

Programs: MPH Community and Behavioral Health, MPH Community Health Education, DrPH Community and Behavioral Health

Faculty: Lori Crane, PhD,  
Concentration Director

### Department of Environmental & Occupational Health

Environmental & occupational health ensures our residential, professional and industrial environments are safe and sustainable. Researchers work closely with industry and policy makers to address issues of clean air and water, environmental health hazards, community and urban development, laws and regulations and sustainability.

Program: MPH, Environmental & Occupational Health

Faculty: Jill Litt, PhD,  
Concentration Director

### High Plains Intermountain Center for Agricultural Health and Safety

The mission of the High Plains Intermountain Center for Agricultural Health and Safety (HICAHS) organization is to reduce and ideally eliminate accidents, injuries, diseases and deaths resulting from agricultural operations through education, intervention and research. Located on the Colorado State University campus in Fort Collins, Colorado, HICAHS is a multi-disciplinary organization with input from a variety of areas including engineering, industrial hygiene, education, toxicology, social work, epidemiology, environmental health, and agricultural sciences. The HICAHS center is one of ten national centers dedicated to agricultural health and safety.

Faculty: Steve Ryenolds, PhD, CIH  
Center Director

### Latino/a Research & Policy Center

The Latino Research and Policy Center (LRPC) 's mission is "to improve the quality of life for Latinos/as in Colorado and beyond through research, policy analysis, forums and publications." The LRPC hosts policy forums to address topics of concern in the Latino and Latina community, including educational equality, regulations for health maintenance organizations in Colorado, and a National Association of Latino Elected and Appointed Officials (NALEO) training session for Latinos and Latinas seeking election to public office.

Faculty: Director Dr. Christine Johnson

### Mountain & Plains Education & Research Center

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The Mountain and Plains Education and Research Center (MAP ERC) is one of 17 Education and Research Centers funded by the Centers for Disease Control/National Institute for Occupational Safety & Health (CDC/NIOSH). Provides graduate training, continuing education and outreach in the seven-state region in the area of occupational and environmental health and safety.

Faculty: Lee S. Newman, M.D., M.A., FCCP, FACOEM, Professor & Director

### Center for Global Health

Serves to improve health and healthcare in communities around the world, through interdisciplinary collaboration within the University and with partners in research, education and health services. The CGH serves as a focal point for global health activities within the University and broader community. The CGH also brings together faculty from various disciplines at the University of Colorado and other Colorado universities to develop and participate in interdisciplinary research on significant global health issues.

Faculty:

Director:

Calvin Wilson, M.D., Department of Family Medicine, School of Medicine and the Colorado School of Public Health

Associate Directors:

Inis Jane Bardella, M.D., F.A.A.F.P., Department of Family Medicine, School of Medicine and the Colorado School of Public Health

Blair Gifford, Ph.D.

International Health Management, Business School

Gretchen Heinrichs, M.D.

Department of Obstetrics and Gynecology, School of Medicine

Renee King, M.D., M.P.H.

Division of Emergency Medicine, School of Medicine

Program Manager:

N. Michelle Shiver, B.S.E.

### **Miscellaneous**

#### International education

Study abroad programs in conservation

example: Grenada: Sustainability in the Caribbean: a 2010 Maymester geography/environmental science study tour to explore sustainability in Granada in the context of a developing country including hands-on experience with devising and implementing possible solutions to locally-needed research questions and agendas (Faculty: Casey Allen, PhD)

#### The IGERT Center for Sustainable Urban Infrastructure

UC Denver received a prestigious \$3.2M Integrative Graduate Education and Research Traineeship (IGERT) grant from the National Science Foundation to develop an innovative inter-disciplinary graduate program on sustainable urban infrastructure. The award supports 26 doctoral students during the five-year grant period from 2007-2012.

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The graduate program, the first of its kind in the country for its breadth across disciplines, spans the Colleges of Engineering, Architecture and Planning, Public Affairs, and Liberal Arts and Sciences.

Faculty:

Principal Investigator & IGERT Program Director: Dr. Anuradha Ramaswami, Civil Engineering

Co-Principal Investigators: Paul Teske, School of Public Affairs; Brian Muller, Architecture and Planning; John Brett, Anthropology & Health and Behavioral Sciences Program; Debbi Main, Health and Behavioral Sciences Program

Geography and Environmental Science Major:

Interdisciplinary Signature Area and Sustainability Minor (College of Liberal Arts and Sciences):

The CU Denver College of Liberal Arts & Sciences has funded the development of new educational opportunities in this critically important area. At the present time, an interdisciplinary advisory group is working to define and enhance future offerings that will help students develop a comprehensive base of knowledge and marketable skill sets. Examples of classes: Principles of Ecology, Global Ecological Crises, Environment and Society, Problems in Sustainability, Sustainable Solutions, Toward a Sustainable Future, Environmental Responsibility.

APPENDIX A7

1

**Proposal for a Signature Initiative in Sustainability  
University of Colorado Denver**

October 1, 2009

(drafted by Mark Gelernter 9-10-09; modified 9-21-09, 9-30-09 and 10-1-09 , 10-30-09 based on feedback – Jim Hageman)

I. INTRODUCTION AND HISTORY

UC Denver faculty interested in sustainability met on Sept. 9, 2009, to discuss how best to develop campus-wide sustainability initiatives for the long term. This first rough draft tries to summarize the main ideas that emerged from the discussion, and needs much additional adjustment and refinement from the participants. The desired outcome is to present a proposal to the Provost for approval, and to obtain the \$100,000 committed to a campus-wide sustainability initiative. The draft document was submitted to all sustainability faculty with a ten day period allowed for comments. These comments have been reviewed and incorporated in one way or another into this second draft which is being shared initially with the dean for further review and comments.

Earlier discussions, as well as the discussion held on September 9, identified the following desirable goals for a campus-wide initiative:

1. The IGERT grant from NSF is a major success of interdisciplinary research on the campus and nation-wide, and the campus-wide initiative should do everything to ensure that this program submit a successful competitive renewal.
2. A campus-wide initiative should support and foster--not compete with--*all* significant sustainability initiatives on campus.
3. A campus wide initiative should significantly enhance the knowledge of *all* sustainability efforts on campus – for both internal and external audiences.
4. The money set aside for the campus-wide initiative is limited and likely not renewable after a year or two; thus, a viable initiative must concentrate on attaining fiscal self-sufficiency as quickly as possible. That is, bringing in extra-mural grants, contracts and collaborators as well as obtaining philanthropic gifts must be part of the overall effort in those areas of sustainability in which this is possible.

Given these desirable goals, the conversations leading up to, and then during, the September 9th meeting focused on one key question: should IGERT form the core of the campus-wide initiative, or should there be another infrastructure or organization of which IGERT and other initiatives are a part?

Here is a summary of the ideas bubbling around these question at the meeting and afterward.

1. One view argues to invest in existing success and an operation already underway, rather than start up a new infrastructure from scratch. Make IGERT the center of the campus-wide initiative, and expand its role to include other initiatives on campus beyond the existing IGERT focus on sustainable infrastructure. This was called **IGERT Plus**.

2. Another view argues that the IGERT focus is still too narrow to accommodate other ideas on campus, but that expanding IGERT too broadly might jeopardize its chances of obtaining a second grant (competitive renewal). In addition, IGERT can work only with units on campus with PhD programs, which leaves out a number sustainability initiatives on campus.
3. One question raised was: since several initiatives related to sustainability predate the IGERT initiative and are on-going how will these be related to or be supported by IGERT or IGERT Plus?
4. An unspoken but subsequently expressed concern was: given the limited funds and the large number of interested faculty, spread in multiple programs, how would adding additional funds (beyond the \$35,000 in matching institutional commitment promised at the outset to IGERT), provide support fairly to the various other sustainability interests, including several in education related to sustainability?

This dilemma--how to expand IGERT to accommodate more than sustainable urban infrastructure, without diluting its focus to a point that it would not obtain a second round of funding--has led to impasses in all previous meetings.

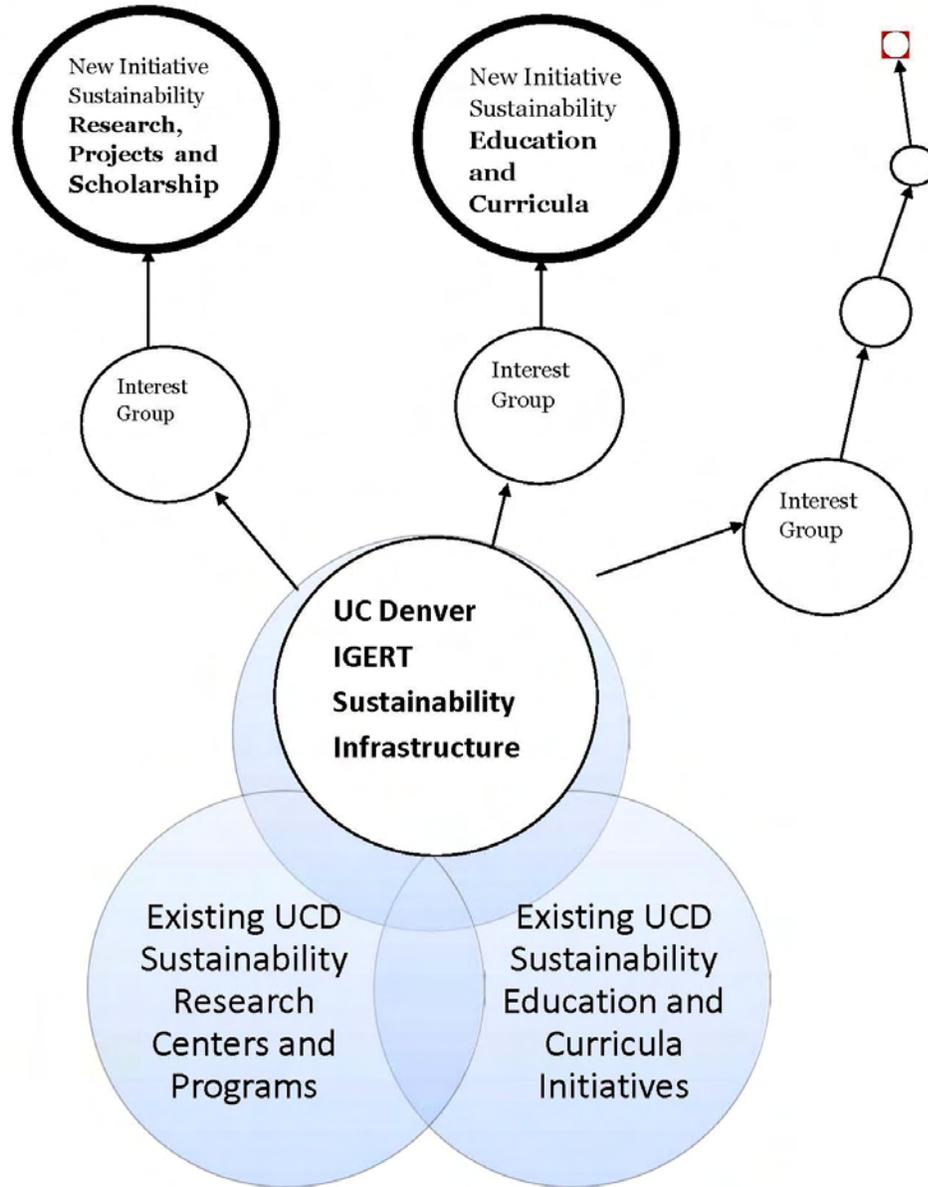
But, a new idea emerged in the all-campus faculty meeting that might finesse this dilemma. Imagine, for a moment, that IGERT is re-conceived as an **incubator** for sustainability initiatives. Indeed, Anu pointed out that the students in the IGERT program are already creating a broad seminar program and special interest groups focused on topics well beyond the initial focus on sustainable infrastructure--as just one example, ethics in sustainability. Other initiatives that might emerge and be led by faculty not directly involved with IGERT include agent based modeling, carbon accounting for business and industry, social networking tools as drivers of sustainability, school-based sustainability educational programs. As an incubator, IGERT can continue to focus its main activities on its central mission of sustainable infrastructure, while assisting in the spinning off other initiatives outside its own purview while offering certain types of support for both new programs and pre-existing interests and programs elsewhere on campus. Thus, by providing additional funding to support the IGERT staff structure, we would gain efficiencies in not having to create new structures to assist all interested parties in accomplishing things we all want.

II. PROPOSAL FOR OPERATION AND FUNDING OF SUSTAINABILITY SIGNATURE AREA

A. Conceptual Outline of Sustainability Signature Area for UCD

A diagram embodying some of these ideas is shown on the following page, along with specific proposals as to how the **Sustainability Signature Area** would operate vis-à-vis the **IGERT Plus Program**.

Proposed Model for Promoting Sustainability Initiatives at UC Denver



In this model of “IGERT Plus” as incubator, its support staff/infrastructure would provide **some** of central services not only for the IGERT grant activities, but also for a **selected number** of existing and new campus initiatives that are beyond the IGERT focus on sustainable infrastructure. As indicated in the diagram the normal expectation is that some of the incubated activities will succeed and some will not. The sorts of central services that IGERT Plus would help provide are listed below.

1. Work with all units and faculty Sustainability Advisory and Leadership Team (SALT -- see below) to develop an inventory and central clearinghouse of sustainability initiatives and faculty interests across campus, with the aim of bringing together people with common interests, and directing to the right people outside inquiries about CU Denver sustainability expertise.
2. Work with faculty advisory group to oversee the creation and maintenance of a UC Denver Sustainability web site. (The SALT Committee members and its chairperson would have immediate responsibility for the items 1. and 2. , using carry-over funds from the first year of the Sustainability Area funding from the Provost’s Office).
3. Work with faculty advisory group (SALT) to manage an annual campus-wide symposium/workshop/conference program on multidisciplinary sustainability topics (water issues, in all of its aspects, was mentioned as an example of a theme).
4. Work with SALT to assist faculty members, as much as resources allow, in the submission of grants to support individual or team efforts in seeking external support of sustainability research or curriculum.

This model will allow IGERT to promote itself as a successful incubator of interdisciplinary sustainability initiatives, when going after the next NSF grant. It takes advantage of existing expertise and infrastructure in its support staff, without having to invent a new structure. But it also makes clear that the IGERT focus on sustainable infrastructure, broad as it is, simply cannot be the all-encompassing umbrella for the many sustainability initiatives on campus, because its purview will by necessity always be too narrow to accommodate all other ideas on campus. It looks after itself, while supporting and promoting other campus-wide initiatives as a related activity. Other new and existing initiatives on campus will not be in competition with IGERT, but rather will benefit from central services that promote these other initiatives as part of a campus-wide program of sustainability.

B. Proposals for Governance of the Sustainability Signature Area.

1. The deans from the five colleges and schools most heavily involved in sustainability (CLAS, BS, SPA, CEAS and CAP) will serve as the oversight body with one member elected by the group as the lead dean. This body should ask for periodic reports from the Sustainability Advisory and Leadership Team (SALT) and provide advice to that group.
2. The deans oversight body will determine and publicize a policy for the equitable distribution of F&A cost recovery funds for the various joint projects.

3. The Faculty Advisory and Leadership Team will be comprised of a faculty member representing each college or school that requests an involvement and be faculty members who are not formal members of the IGERT program. Members are to be selected as specified by the school or college deans. The body must include one representative from the IGERT program selected by that group.
  4. The SALT will elect a chairperson for the group and establish some minimal written guidelines for its operation.
  5. The SALT will develop a plan for the expenditure of the funds made available to it (\$25,000-\$45,000/year) that is approved by the deans and carries out the objectives outlined in this document to the greatest extent possible: (1) establish an inventory of sustainability activities, (2) develop a web site that directs those inquiring to appropriate contacts within UC Denver, (3) develop and execute a seminar program, (4) select projects to support and go forward with the assistance of IGERT Plus to obtain funding and (5) to work with IGERT Plus to develop a major conference in sustainability in 2012. SALT should be mindful that a key measure of success will be promoting the garnering of external resources to allow its continuing function.
- C. Proposal for Generation and the Distribution of Signature Area Funds (\$65,000/year)
1. Commit \$40,000 to the hiring of a support staff to work closely with Luann Rudolph and the SALT Committee Members to see that the incubator activities described in this document are carried out as effectively as possible.
  2. Generate an additional \$20,000 to \$25,000 per year by college and school contributions to generate a total pool of \$45,000-\$50,000 per year to be overseen and distributed by the faculty Sustainability Advisory and Leadership Team.
  3. The SALT will be charged with consulting with their constituents and the IGERT staff to use the funds available to accomplish the activities described in this document – including web site development, an excellent seminar program, annual conference and the stimulation of grant-getting activities to make the signature area truly sustainable. The SALT will make their budgeting process known to all faculty members involved in the Sustainability Signature Area and will consult as needed with the deans oversight committee.

