

# SIERRA



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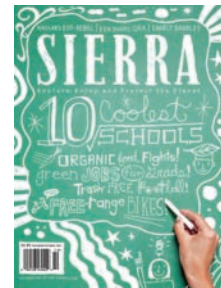
## SIERRA MAGAZINE'S 2010 "COOLEST SCHOOLS" QUESTIONNAIRE



2007



2008



2009

EFFICIENCY  
ENERGY SUPPLY  
FOOD  
ACADEMICS  
PURCHASING  
TRANSPORTATION  
WASTE MANAGEMENT  
ADMINISTRATION  
FINANCIAL INVESTMENTS  
OTHER INITIATIVES

# SIERRA

*Sierra*, the award-winning magazine of the Sierra Club, is compiling information for our fourth annual “Coolest Schools” issue, which will rate American colleges and universities according to their environmental practices, green initiatives, and caliber of sustainability-oriented education.

Schools that score highly in these realms may be contacted for further discussion and will receive recognition in the magazine’s September/October issue. Please fill out this interactive PDF as thoroughly as possible, save it with your responses as “2010\_coolschools\_your school’s name” and email it to [cool.schools@sierraclub.org](mailto:cool.schools@sierraclub.org) no later than **March 20, 2010**.

Note that this questionnaire will become a public document and that we will not be altering your responses before publishing them online. Please answer as thoroughly as possible. Questions left blank will receive no credit, and if a question requests a percentage, you must provide a percentage. The scoring key will be available online once the issue is published.

As the publication of the nation’s oldest and largest environmental nonprofit, *Sierra* has a readership of more than 1 million engaged and educated citizens.

Many thanks for your participation.

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**School name:**

**Contact name and title:**

**Contact phone:**

**Contact email:**

**School’s city and state:**

**Number of students:**

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**HONOR PLEDGE:** By completing and submitting this questionnaire, you are certifying that all statements in this document are true to the best of your knowledge.

**INITIAL:** \_\_\_\_\_

**DATE:** \_\_\_\_\_

## Category 1: Energy Supply

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*(1-1) Please break down the energy types that your campus uses for electricity by percentage. If the school purchases its electricity from a utility company, this information should be available from that company.*

- Approximately 30% gas, 10% wind, and the balance fuel oil/coal.
  - 2005\* eGrid emissions factor = 1.89 lbs CO<sub>2</sub>e/1000kwh
  - <http://cfpub.epa.gov/egridweb/ghg.cfm>
- \*This is the latest available CO<sub>2</sub>e emission factor for Colorado's electrical grid. The eGrid system from EPA calculates the amount of carbon emissions associated with each grid's unique fuel mix/burn rate in arrears based on actual combustion reports from the utilities. This is the most accurate analysis; however, it is not available in real time. This hampers reporting as it is known that numerous wind farms have come online in Colorado since 2005; however, they are not captured in the eGrid yet and can only be estimated by the utility.
- CU recently installed five medium/large solar PV panels on roof of our Law School, Coors Event Center, Mountain Research Station, Housing Maintenance Service Center and Chancellor's Residence totally over 175,000 kWh/year. Additional installations occurring at Mountain Research Center in 2010. in addition to expanding our solar PV installation at MRS, we are planning to add 100 kW of PV at CINC building followed by three other major solar PV installation at the new IBS building, Systembio and Will.Village II-a before the end of this year. The above projects will triple our current PV installation by the end of 2010.

*(1-2) What type(s) of energy does your campus use for heating buildings (e.g., natural gas, biomass, coal)?*

- 100 % Natural Gas

*If cogeneration, please explain:*

- Yes, the university has an on-campus, natural gas fired cogeneration plant that supplies steam to heat and chilled water to cool the buildings--and produces electricity for the campus 10-15% of the time.
- Plans are being finalized to rebuild the cogeneration facility into a so-called 'base load' cogen plant that would provide upwards of 80% of CU's electrical supply from natural gas at half the current emissions rate.

- Likewise, CU is continuing to develop opportunities with major wind energy suppliers to connect directly to utility-scale wind electricity supplies per the goals in our carbon neutrality plan. Available at: [www.colorado.edu/sustainability](http://www.colorado.edu/sustainability)

## Category 2: Efficiency

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(2-1) What percent of campus buildings completed within the past three years have a LEED certification of at least silver?

- **100** %

Note whether the certification is higher than silver.

- 5- LEED NC Gold, 1- LEED EB Silver and 9 pending LEED certification (**Gold level or better**).

(2-2) What percentage of water used for campus landscaping is from recovered, reclaimed, or untreated sources?

- **100**%
- We are using our water rights to irrigate the campus from ditch water. Our irrigation system is connected to two weather stations for maximum water efficiency.

(2-3) What percentage of campus lighting fixtures are energy-efficiency (e.g., compact fluorescent, LED, or equipped with motion sensors, automatic daylight shutoff, or other energy-saving features)?

- **100**% general purpose lighting. LED is gaining significant applications in our new buildings/constructions projects.
- **95**% of all campus lighting is T-8 fluorescent or CFL. 5% are special purpose lighting for museum or theatrical applications.

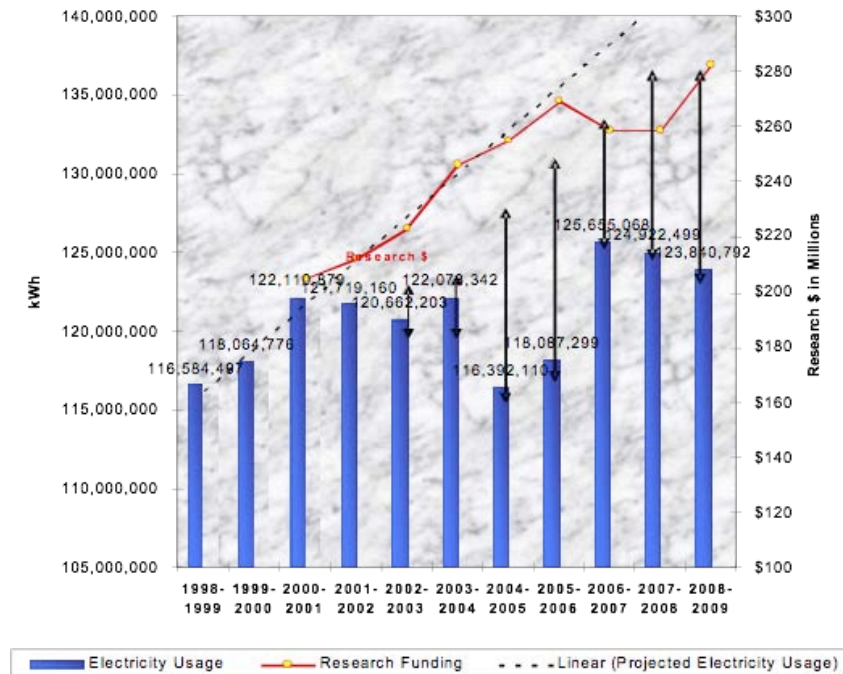
(2-4) What percentage of campus appliances are Energy-Star rated?

- Over 80% of Dell computers and monitors are Energy Star rated. Most small kitchen appliances purchased from Grainger are Energy Star rated. Overall rating between 40-50% as an estimate.
- We have recently announced a rebate program (administered by our campus Purchasing Group) to rebate the possible price premium associated with Energy Star appliances.

5. (2-5) Does the institution have underway a program of energy-efficiency retrofitting projects, such as improving building insulation or sealing heating and cooling ducts?

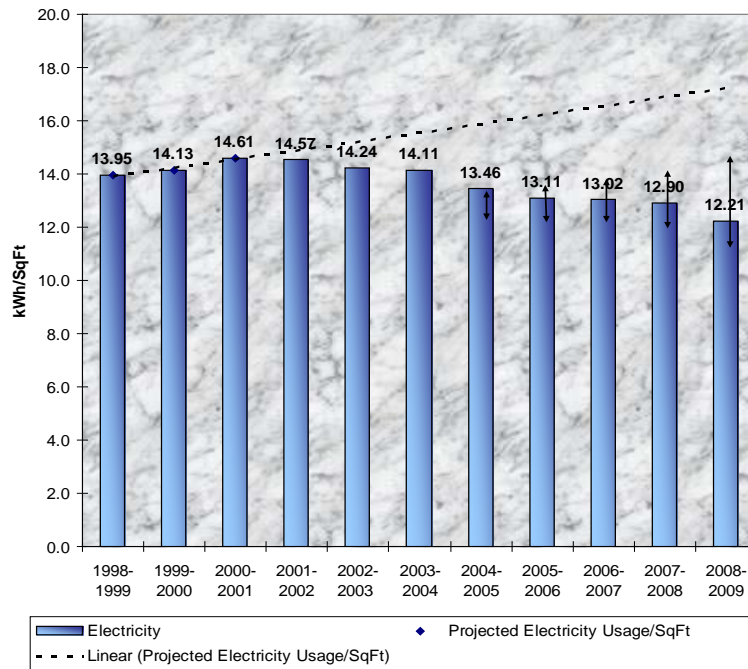
- Yes. The campus was scanned by a helicopter equipped with Infra red camera (IR scan) to identify roofs/ buildings in need of additional insulation.
- Our energy efficiency retrofit program ranges from building HVAC systems recommissioning all the way to doors/windows weather-stripping.
- These efforts begun in the year 2000 have resulted in a long term energy conservation trend as given below (note the campus has added ~3-million square feet and millions of dollars of research during this period):

### Electricity use



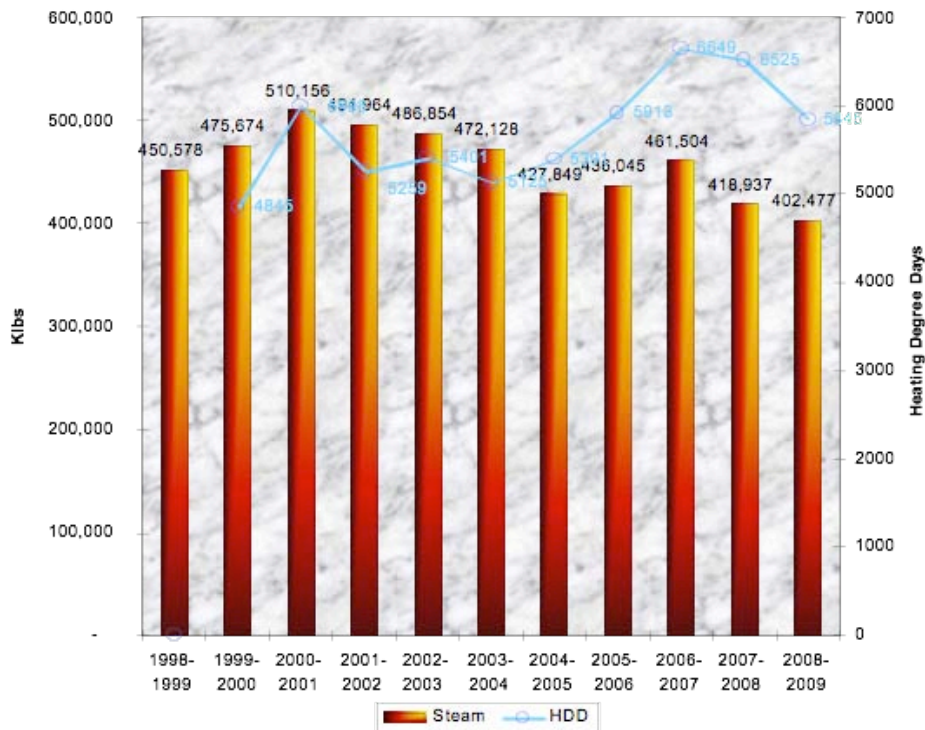
- A new conservation competition (EcoStar Challenge) in the residence halls last year resulted in:
  - 1% decrease in electricity consumption = 29307 kWh reduction = 27 ton reduction of greenhouse gases
  - 8% decrease in water consumption = 1465 kGals reduction = 1.5 ton reduction of greenhouse gases
- The Buff Energy Star competition, where we reward building managers/proctors for achieving at least 5% energy usage reduction over the 12 months period with a \$1000 reward check, has over the past 4 years has resulted in over 1.7 million kWh energy conservation and a cost savings of \$205,000 as well as CO<sub>2</sub> reduction of 3.5 million pounds.

- A declining electricity per square foot trend attests to the effectiveness of conservation programs and a robust (LEED Gold) green building program:



- A similar conservation trend is noted in steam use over the period:

### Steam Use



### Category 3: Food

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*(3-1) What percentage (in dollars) of food served at cafeterias is grown or raised within 100 miles of the campus?*

- Given our cold climate and short growing season, we are currently able to source less than 5%; however, we are continuously seeking new sources. We are also working with our University procurement department to revise the rules to provide more flexibility.

*(3-2) What percentage (in dollars) of food served at campus cafeterias is USDA-certified organic?*

- ~5-10%. One dining unit serves 100% natural and organic foods. We offer organics in our catering operations upon request.

*(3-3) Do campus cafeterias source seafood that is deemed sustainable by the Marine Stewardship Council, the Monterey Bay Aquarium's Seafood Watch Program, or a similar program?*

- We utilize the Monterey Bay Aquarium's Seafood Watch Program, staying away from "AVOID" items (items caught or farmed in ways that harm other marine life or the environment).

*(3-4) What percentage of entrées served in campus dining locations include meat? If the meat is produced sustainably (for example, free-range or grass-fed), explain:*

- Approximately 1-5% is produced sustainably – both through our natural/organic grab-n-go and through catering (upon request).

*(3-5) Are nutritionally complete vegetarian and/or vegan options available at every meal?*

- 100%. We have vegetarian and vegan options available at every meal. In addition, catering includes many vegetarian and vegan options.

*(3-6) Is bottled water sold or distributed on campus?*

- Bottled water is no longer served in campus dining halls and sales are declining in retail centers. Likewise, all incoming freshman are given a free refillable water container and water refill stations are installed across campus. One recently installed refill station (Baker) that has a digital counter registered 15,000 refills in two months.

*(3-7) Does your school maintain a campus farm or garden? Does it use organic methods? Please describe the garden and methods used.*

- Yes, several plots are currently in operation. All are organic. Family Housing has plots for residents at their facilities. Environmental Design and the UMC have herb gardens. Additionally, plans for large scale solar greenhouses are underway and partially funded. University dining halls have agreed to purchase produce from local gardens as available.

## Category 4: Academics

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*(4-1) Does your school offer any environmental- and/or sustainability-related majors, such as environmental studies, ecology, or sustainable agriculture? If so, list them all:*

- **CU-Boulder offers over 25 degrees directly related to the study of the environment**, as well as five certificates and a service learning program (INVST).
  - Environmental Studies: BA, MS, PhD
  - Ecology and Evolutionary Biology: BA, MS, PhD
  - Geography: BA, MS, PhD
  - Architecture and Planning (Environmental Design): BA
  - Environmental Engineering: BS, MS, PHD
  - Journalism (Environmental Journalism): BS, MA, PhD
  - Anthropology: BA, MS, PhD
  - Geological Sciences: BA, MS, PhD
  - Law School (Environmental and Natural Resources Law): JD
- Dual Degrees:
  - Environmental Studies (MS) and Law (JD)
  - Environmental Studies (MS) and Business (MS)
- Graduate Certificate Programs:
  - Hydrologic Sciences Graduate Program
  - Graduate Certificate on Environment, Policy, and Society
  - Interdisciplinary Graduate Certificate Program in Environmental Policy
  - Western American Studies Certificate
  - Continuing Education Certificate Program in Sustainable Practices
- Other Programs
  - INVST Community Leadership Program

*(4-2) Does your school offer classes about clean technologies, including topics such as energy efficiency and solar-wind energy engineering? If so, please list them all:*

- ANTH 4020/5020 Anthropology of Energy In this seminar, we will use an anthropological perspective to consider the social and environmental implications of four key sources of energy: oil, coal, nuclear and renewables.

- AREN 3130-020 Building Energy Laboratory (3 credits). Two lectures, one 3-hour lab per week. Offers a laboratory course on mechanical systems in buildings, focusing on building applications of thermodynamics, fluid dynamics, and heat transfer. Applications include solar collectors, pumps, fans, heat exchangers, and air conditioning and refrigeration systems. Prereq., AREN 3010. Brandemuehl.
- ASEN 4519/5519 Energy Systems for Earth and Aerospace Applications. The main alternative energy systems that are nowadays heralded as "sustainable" or "renewable" for Earth applications have long been used in Space systems. The aerospace industry has spearheaded the development of these energy systems. The goal of the course is to provide engineering students with basic and in depth knowledge of the scientific foundation for four alternative energy resources for space and Earth applications. Prereq: Junior level background in Materials Science, Thermodynamics, Fluid Mechanics, Physics, Chemistry. Koster.
- BADM 6930 Assessing Sustainable Energy Technologies. Focuses on the cost "fundamentals" of emerging energy technologies, including solar, wind, biomass, oceanic, geothermal, hydropower, fuel cell (hydrogen), nuclear, and other more exotic energy sources. A premise of the course is that a sustainable energy technology must both be technically feasible and economically viable. We consequently quickly review the technological promise and progress of each technology, but will focus on its economic opportunities and challenges. At the conclusion of the course, students will have a solid economic understanding of these emerging energy technologies. Lawrence.
- CHEM 5061 (3) Advanced Inorganic Chemistry 2. Lectures in physical Inorganic chemistry with an emphasis on topics for understanding modern solar energy conversion to electricity and fuels. Includes a description of bonding and properties of coordination compounds in terms of the ligand field and molecular orbital theories. The primary research literature will be used to motivate exploration of relevant themes including spectroscopy, electron transfer, energy transfer, bioenergetic conversion, and small-molecule activation. Prereqs., CHEM 4011 and 4531, or graduate standing. Damrauer.
- CHEM 5171 Electroanalytical Chemistry (with emphasis on Energy Conversion and Storage). This course will cover the following topics: Physical Chem. of Conducting Solids, Ionic Solutions & Electrochemical Cells, Instrumentation and Techniques, and Energy Conversion and Storage. Carl Koval.
- CHEM 6111 Special Topics in Analytical Chemistry (Nanoscience in Chemical Analysis and Biotechnology), 3 credits. Note that this course is

incorrectly listed in the PLUS course registration system as CHEM 6111 - SP TPC: ATMOSPHERIC). The course will explore fundamental principles and applications of nanometer-scale chemical systems. Topics will include chemical and biological synthesis of nanoparticles, nanowires, and nanotubes; ordered assemblies and crystals of nanoscale systems; nanostructures in chemical analysis; biomedical applications of nanomaterials; societal implications of nanotechnology; and, industrial nanotechnology -- including energy conversion applications such as quantum dots.

- CHEN 4838-001 Energy Fundamentals: Global and Future Perspectives (3 credits). This course is the study of the earth's energy past, present and future from a fundamental, scientific point of view. The primary learning objective is to gain a scientifically-based understanding of energy sources and demands that will allow the student to grasp our energy future from a realistic perspective. Energy sources will include nuclear, biomass, solar, hydro and wind. Demands will include transportation, manufacturing, agriculture, lighting, heating and air conditioning. The environmental impacts of our energy future will be considered. Having completed this course, students will be able to engage in policy discussions, planning and decision-making on energy matters with a sound, factual foundation. Prerequisite: thermodynamics. Clough.
- CVEN 4838/5838 Sustainability and the Built Environment (3 credits). This course introduces students to the fundamental concepts of sustainability and sustainable development. Special emphasis is placed on understanding the interaction of the built environment with natural systems and the role of technical and non-technical issues in shaping engineering decisions. Issues such as green development, renewable energies, appropriate technology, and systems thinking are discussed. Amadei.
- CVEN 5020 Building Energy Audits (3 credits). Analyzes and measures performance of HVAC systems, envelopes, lighting and hot water systems, and modifications to reduce energy use. Emphasizes existing buildings. Prereq., AREN 3010 or equivalent. Krarti.
- CVEN 5050 Advanced Solar Design (3 credits). Predicts performance and analyzes economics of high temperature, photovoltaic, and other innovative solar systems. Also includes performance prediction methods for solar processes. Prereq., AREN 2010 or equivalent. Brandemuehl.
- CVEN 5830-002/CVEN4830 Sustainable Building Design. Buildings can be designed to produce less greenhouse gases while being more comfortable, healthy and economical through the proper application of sustainable design principles. This course will review sustainable building technologies and provide insight into evolving design principles. The

course will explore aspects of building thermal performance, indoor and outdoor environmental quality, occupant comfort, and climate relevant to building design. Topics include sustainable building elements, climate and comfort parameters, passive and active energy systems, and environmental implications of building. Advanced architectural design concepts and methods will be applied to energy-efficient and environmentally responsible building design. The prevailing building simulation tools for building materials selection, ventilation design, energy calculation, and climate analysis will be introduced. The course emphasizes both a fundamental understanding and practical applications of sustainable building design strategies. Zhai.

- CVEN5830-005 Building Energy Systems. This is a fundamental course for graduate students entering the Building Systems Program (BSP) but without general Civil or Architectural Engineering background. The course mainly covers three parts of materials: (1) building thermal systems, which will present the application of heat transfer and flow mechanism in building (including heat transfer principles, heat transfer through envelope and fenestration, heat transfer via ventilation and infiltration, solar heat transfer, building load calculation, thermal comfort, and indoor air quality); (2) building electrical systems (including general fundamentals and applications); (3) building lighting systems (including basic lighting terminologies, analysis method, and system configurations). The course will prepare students with general knowledge and skills that are required by the following advanced technical courses offered at BSP. The course also offers an overview of integrated building systems and design that create a comfortable, safe, healthy, productive, and efficient building environment. Zhai.
- ENVS 4800-001 Biofuels This course will explore the technical, ecological, economic and policy aspects of biofuels production using argument, analysis and critical thinking. Class will consider emerging topics of biofuels including climate change, greenhouse gas production and mitigation, biodiversity, and genetic engineering. You will develop your ability to make, analyze, and respond to arguments in the context of controversies surrounding biofuel production and sustainability.
- ENVS 5100-004 TPC-Environmental and Energy Economics This is a graduate-level course in environmental economics and energy policy. Students will learn to apply economic principles to analyze environmental policies in energy markets. Course goals are to understand: how markets work; the consequences of environmental externalities and other market failures; and how the characteristics of markets impact effective policy. The emphasis will be on examples from electricity generation, renewable energy, manufacturing, transportation and other energy intensive industries. A variety of policy instruments will be studied including: technology and emission standards; renewable portfolio standards and

renewable fuel standards; low carbon fuel standards; emissions taxes and cap and trade systems.

- ECEN2060 Renewable Sources and Efficient Electrical Energy Systems Introduction to present and future electrical power systems, including renewable power sources, interface to the utility grid, and efficient utilization of power. The major topics covered are: the nation's electrical power system, photovoltaic power systems, wind power systems, hybrid and electric vehicles, energy efficiency in buildings, lighting, HVAC, computer systems.
- ECEN3170 Energy Conversion 1 Architectures, block diagrams, and operation of electromechanical systems. Energy system components, including renewable energy sources, controllers, power electronic circuits, inductors, transformers, rotating/linear machines (motors and generators), and mechanical loads.
- ECEN4167 Energy Conversion 2 Efficient electric motor/generator drives: induction and synchronous motors and generators, power electronic rectifiers and inverters, controls of drives.
- ECEN4517/5517 Renewable Energy and Power Electronics Laboratory Hands-on design, construction and testing of a photovoltaic power system, including solar panels, battery storage, and power electronics: switched-mode power converters for peak power tracking and battery charge control, dc-dc voltage step-up converters, and dc-to-ac inverters.
- ECEN4555/5555 Principles of Energy Systems and Devices Understanding device technology for renewable energy requires knowledge of aspects of thermodynamics, electronic and radiant devices, materials and nanostructures. This course provides a foundation in statistical thermodynamics, and uses it to analyze the operation and efficiency limits of devices for photovoltaics, energy storage (batteries & ultra-capacitors), chemical conversion (fuel cells & engines), solid state lighting, heat pumps, cooling, and even the harvesting zero-point energy from the vacuum.
- ECEN4797/5797 Introduction to Power Electronics High-frequency, high efficiency electronic power converters for control of energy. Topics include circuit operation, steady-state converter modeling and analysis, switch realization, discontinuous conduction mode, transformer-isolated converters, converter control systems including ac modeling of converters using averaged methods, small-signal transfer functions, and feedback loop design; design of inductors and transformers for switched-mode converters.

- ECEN5005 Photovoltaic Devices A graduate level introduction to Photovoltaics, the physics behind the technology, the devices and practical applications. Traditional and renewable energy sources, thermodynamics and general energy related issues. Photovoltaic cells, semiconductor physics, solar cell structures, their principle of operation, design and fabrication. Photovoltaic systems including power converters and energy storage, residential grid-connected photovoltaic systems including the economics and government incentives, tracking solar systems and concentrators and thermal photovoltaics.
- ECEN5017 Conventional and Renewable Energy Issues Effects of changes in the structure of the electric utility system caused by distributed generation or co-generation involving deployment of renewable energy sources such as wind and solar. Topics covered include load forecasting, load and frequency control approaches, power flow issues, and energy storage techniques.
- ENVS 3621 Energy Policy and Society Examines how society makes decisions about energy, and how these decisions affect the environment and the economy. Uses tools from policy analysis, economics, and other disciplines to build an in-depth understanding of energy's role in U.S. contemporary society. Komor.
- ENVS 4100 Energy Policy. Varies by semester. Contact department for details.
- ENVS 4100-002 Carbon neutral CU. University of Colorado at Boulder's Chancellor Bud Peterson recently signed the climate-neutrality pledge for UCB's campus as detailed in the American College and University President and Chancellor's Climate Commitment (ACUPCC). The pledge requires UCB to implement certain short term carbon mitigation activities - and a two year process to create a robust plan and forecast date by which to attain campus climate-neutrality. Climate neutrality is defined by the ACUPCC as "no net emissions of GHGs." Under the ACUPCC commitment, UCB must complete its "Comprehensive Plan for Climate Neutrality," by September 15, 2009. Students will learn the concepts that inform this definition of climate-neutrality, the technical approaches available to the campus that can be employed, develop an analytical framework by which to evaluate these options, and draft a proposed strategic plan that would guide an implementation analysis of available options. Newport.
- ENVS 5100 Energy Policy Research Seminar (1 credit). Presentations by CU faculty and others on energy policy research. Komor.

- ENVS 5100 Energy Science and Technology. This course examines the basics of energy science and technology with a focus on the fundamentals of both conventional and renewable/sustainable energy. The first half of the course concentrates on conventional energy sources such as oil, natural gas, coal, nuclear and hydroelectric. The second half concentrates on renewable/sustainable energy technologies including wind, solar, biomass, geothermal, ocean and conservation. A thorough comparison between conventional and renewable energy sources is a key to understanding the possibilities and limitations of new energy sources. We investigate the technological promise and progress of each technology, as well as its limitations and challenges. At the conclusion of the course, students will have a solid understanding of energy sources and the foundation to pursue additional energy study. Stockton.
- ENVS 5820 Renewable Energy Policy (3 credits). Renewable conversion technologies have shown remarkable cost and performance improvements in recent years. Although renewables (excluding large hydro) currently supply less than four percent of U.S. energy needs, they could provide much more. However, plentiful resources and working technologies are necessary but not sufficient to ensure widespread use. This course will use a mix of lectures, guest speakers, discussions, mock debates, and student presentations to tease apart the complex process through which renewable technologies move from niche markets to widespread use. The focus is on renewable technologies for on-grid electricity generation. Komor.
- GEOL 3500 Earth Resources and Environment. Examines Earth's most important natural resources and their impact on society and the environment. Addresses the geology, occurrence, production, and use of petroleum, coal, mineral, and water resources. Future world energy supply and demand, conservation, and the transition from fossil fuels to non-polluting renewable resources are discussed. Pranter.
- GEOL 3520 Environmental Issues in Geosciences. This course explores where our energy comes from and the potential for future sources. As fossil fuels dominate our energy production, we will also investigate the hype and realities of climate change and greenhouse gases. We will consider these topics through the lenses of basic science, policy, politics, economics and ethics. Same as ENVS 3520. White.
- GEOL 3540 Introduction to Hydrocarbon Geology. Addresses the origin and distribution of conventional and unconventional petroleum and coal resources, source rocks, types of traps and seals, reservoir rock properties, exploration and development methods, reservoir characterization and modeling, and reserves calculations. Pranter.

- HONR 4000 Sustainable Energy. The goal of this course is to provide a framework for assessing policy options that can lead to a paradigm shift from fossil to renewable energy sources. We will examine available and future technologies in the context of their environmental impact as well as their technical and economic viability. Kreith.
- LAWS 6712 Law, Science and Policy of a Changing Climate. Examines the science of climate change and the broader role of science in public policymaking. Reviews the changing legal landscape to abate greenhouse gas emissions, and key issues in policy design. Reviews the Supreme Court's April 2nd, 2007 decision in Massachusetts v. EPA, overturning EPA's refusal to regulate greenhouse gas pollution from motor vehicle tailpipes, and the aftermath in the courts, Executive Branch and Congress. William Boyd.
- LAWS 6722 Energy Law and Regulation. This course provides an introduction to energy law and regulation in the United States. It covers basic principles of rate regulation and public utilities, the division of jurisdiction between federal and state governments, and the key federal statutes and regulatory regimes governing natural gas, electricity, and nuclear power. Much of the course will focus on the basic federal frameworks for natural gas and electricity regulation, with an emphasis on understanding the messy and uneven transition to wholesale competition in these sectors and, in the electricity context, the experience with state restructuring and retail competition. The course will also introduce students to the distinctive federal regime governing nuclear power. The last part of the course will address new challenges confronting electricity regulation (and energy law generally) as a result of emerging mandates for renewable energy and greenhouse gas emissions. This course does not cover traditional oil and gas law. William Boyd.
- LAWS 7122 Mining and Energy Law. Addresses major issues affecting the development of mineral resources through mining activity. Includes the regulation of the impacts of mining on the environment on both public and private land. Covers the Mining Law of 1872, the Federal Coal Leasing Amendments, and state regulation of the impacts of mining on the environment.
- LAWS 7132-001 Energy Insecurity and Sustainable Energy. Part I will deal with the phenomena and meaning of energy security. It will examine energy insecurity in the United States, and the international community of nations, caused by reliance on hydrocarbons, and specifically by oil dependence. Part II of the course will survey the corpus of existing United States and International Laws relevant to this question. Part III will canvass the legal response to these challenges through sustainable and renewable energy laws and policies. Guruswamy.

- MBAX 6130 (3). Sustainable Business Ventures. Focuses on environmentally sustainable business ventures as well as issues associated with starting and operating a business that solves natural environmental challenges while achieving profitability. Includes a number of case studies, topical discussions, talks by environmental entrepreneurs, and an applied or library research project.
- MBAX 6825-3 Sustainable Business. Exposes students to an overview of concepts related to the challenges of meeting the interests of all stakeholders in a way that balances social, environmental, and economic resources and impacts. Readings will be selected to present competing viewpoints on several topics to provide students the opportunity to synthesize arguments during class discussions and reach their own conclusions.
- MCEN 4228/5228-01 Climate Solutions. Contact department for details.
- MCEN 4228/5228 Energy Conversion and Storage. For large-scale solar or wind based electrical generation to be sustainable, the development of new energy conversion and storage systems will be critical to meeting continuous energy demands and effectively leveling the cyclic nature of these energy sources. This course is designed to be a comprehensive introduction to the basic principles of electrochemistry and their application to energy conversion and storage systems. Lee.
- MCEN 4228-005 Wind Energy. This course is an overview of the basics of wind energy technology. Students will gain a general understanding of the many disciplines used in developing wind energy conversion systems. Students will also gain limited exposure to advanced research topics in the wind energy field. At the end of this course, students should be able to understand the basic steps required for developing a wind turbine design. The students should also understand how various engineering disciplines interact in the design process. Pawlas.
- PHYS 3070/ ENVS 3070-001 Energy and the Environment (3 credits). Contemporary issues in energy consumption and its environmental impact, including fossil fuel use and depletion; nuclear energy and waste disposal; solar, wind, hydroelectric, and other renewable sources; home heating; energy storage; fuel cells; and alternative transportation vehicles. Included are some basic physical concepts and principles that often constrain choices. No background in physics is required. Approved for arts and sciences core curriculum: natural science.

(4-3) Does your school provide students with a list of environmental and/or sustainability classes to make such courses easy to identify? Please provide a link, if available.

- YES : [rasei.colorado.edu/energy\\_courses](http://rasei.colorado.edu/energy_courses) & <http://recycling.colorado.edu/files/49901e78bf22ae4e389a6dfb5a2a074135e4220.doc>

(4-4) Please provide names of standout professors who work on environmental and/or sustainability issues and list their accomplishments, including awards, honors, and publications.

- **CU has over 40 faculty or affiliated faculty members that are members of the IPCC, including IPCC co-chair, Susan Solomon.**  
Notable faculty include:
  - Bradley H. Udall, Director, Western Water Assessment,
  - Pieter Tans, Senior Scientist, NOAA/ESRL; Former CIRES Fellow
  - Roger Pielke, Jr., Professor, Environmental Studies Program; Fellow of CIRES
  - John Wahr, Professor, Physics; Fellow of CIRES
  - Ted Scambos, Glaciologist, Lead Scientist; NSIDC/CIRES
  - Elizabeth Weatherhead, Senior Research Scientist, CIRES
  - Konrad Steffen, Professor, Geography; Director of CIRES
  - Steve Nerem, Professor, Aerospace Engineering Sciences; Associate Director, Colorado Center for Astrodynamic Research; Fellow of CIRES
  - Mark C. Serreze, Senior Research Scientist, NSIDC; Research Faculty, Geography; Fellow of CIRES
  - Jim White, Professor of Geological Sciences, Director of INSTAAR
  - Alan Townsend, Fellow and Associate Director, INSTAAR
  - Diane McKnight, Professor of Civil, Environmental and Architectural Engineering; Fellow of INSTAAR
  - Gifford Miller, Professor of Geological Sciences; Fellow of INSTAAR
  - Jason Neff, Assistant Professor of Geological Studies; Environmental Studies
  - Sharon Collinge, Associate Professor of Biology and Environmental Studies
  - Carl Koval, Professor and Chemistry and Biochemistry; Director, University of Colorado at Boulder Energy Initiative
  - Stein Sture, Professor of Civil, Environmental, and Architectural Engineering; Vice Chancellor for Research, Dean of the Graduate School
  - Paul Komor, Energy Education Director, Environmental Studies Department
  - Al Weimer, Professor of Chemical and Biological Engineering
  - Lucy Pao, Professor of Electrical and Computer Engineering

- Josef Michl, Professor of Chemistry and Biochemistry. Member of the National Academy of Sciences,
- David Jonas, Professor of Chemistry
- Lakshman Guruswamy, Nicholas Doman Professor of International Environmental Law; Director of the Center for Energy & Environmental Security (CEES)
- Patty Limerick, Professor of History; Faculty Director and Chair of the Board of the Center of the American West

Below is the ENVS roster (all co-rostered with other departments to promote inter-disciplinary cross pollination):

- Lee Alston ECON ENVS IBS Economic History, Economic Development, Political Economy, Environmental Economics, New Institutional Economics
- Krister Andersson PSCI ENVS Politics of environmental governance in forestry policy reforms in developing countries and international climate change mitigation strategies
- Lisa Barlow BRAP ENVS Global Change, Intro to Geology, Intro to Environmental Studies, Campus and the Biosphere (on-campus sustainable solutions consulting), sustainability studies
- Peter Blanken GEOG ENVS Biometeorology, water and carbon cycling, hydrology of high latitude wetlands and lakes.
- William Boyd LAW ENVS Energy law and regulation, environmental law, and climate change law and policy.
- Maxwell Boykoff CSTPR ENVS Environmental governance, science and policy interactions, political economics and the environment.
- Susan Buhr CIRES ENVS Professional development for science teachers, provision of education related to research projects.
- Sharon Collinge EBIO ENVS Population and community ecology, conservation biology, restoration ecology, landscape ecology, and landscape planning. Ecological consequences of habitat loss.
- Deserai Crow JOUR ENVS Environmental policy and the role that mass media and other factors play in policy decisions.
- Lisa Dilling ENVS CSTPR The use of information in decision making related to climate and, in particular, the carbon cycle.
- Samuel Fitch PSCI ENVS Policy sciences, policy analysis and policy processes. Research on civil-military relations and democratization in Latin America.
- Nicholas Flores ECON ENVS IBS Decision-making and the environment; analysis of public goods provision; valuation of environmental and public goods.
- Benjamin Hale ENVS PHIL CVSP Environmental ethics and policy, applied ethics, normative ethics, metaethics, ethical and environmental concerns of emerging technologies.

- Jonathan Hughes ECON ENVS The consequences of adoption of environmental policies in energy markets, climate change policy, gasoline, electricity and renewable energy markets.
- Douglas Kenney LAW ENVS Water resources policy, law and management; reform of natural resources institutions; impacts of population growth and climate change on western US natural resources; collaborative problem-solving
- Paul Komor EI ENVS EI Renewable energy technologies and policies, and their relationship to electric utility restructuring
- Carl Koval CHEM ENVS Removal of Carbon Dioxide from the Atmosphere using Electrochemically Modulated Complexation; Properties and Uses of Ionic Liquids; Non-Mechanical Pumping of Fluids
- Jill Litt UCHSC ENVS Neighborhood environments and health, risk assessment, environmental justice; community-based participatory research
- Diane McKnight CEAE ENVS INSTAAR Limnology, aquatic ecology, reactive transport of metals and organic material in streams and rivers.
- Jana Milford MCEN ENVS Mathematical modeling and design of control strategies for photochemical air pollution, air pollution exposure assessment and source apportionment, wildfire behavior modeling and environmental policy
- Dale Miller ENVS Scientific writing
- Jason Neff GEOL ENVS Biogeochemistry
- Diana Nemergut ENVS INSTAAR Environmental microbiology, microbial diversity and evolution, microbial community interactions, biogeochemistry.
- Roger Pielke, Jr. CIRES ENVS CSTPR The relation of scientific information and public and private sector decision making, technology policy in the atmospheric and related sciences
- Robert Sievers CHEM ENVS CIRES Analytical chemistry, pharmaceutical science, aerosols, microparticles and nanoparticles, supercritical fluids, and thin film deposition
- Mark Squillace LAW ENVS LAWS Environmental and Natural Resources Law
- Ken Strzepek CEAE ENVS Water Resource planning and management, River basin planning, Modeling of agricultural, environmental, and water resources systems.
- Paul Sutter HIST U.S. history, environmental history, history of soils and soil erosion.
- Darin Toohey ATOC ENVS BRAP Kinetics, spectroscopic, and field measurements of trace species in the troposphere and lower stratosphere; design and fabrication of fast-response in situ instrumentation.
- Alan Townsend EBIO ENVS INSTAAR Carbon & nitrogen dynamics at regional-global scales; phosphorus controls over C & N in moist tropical

systems; nutrient controls over soil carbon storage; human health effects of a changing N cycle

- William Travis GEOG CIRES ENV5 Interaction of environment and society, including land use and anthropogenic transformations of land cover, with a focus on the American West.
- Steve Vanderheiden PSCI ENV5 Normative political theory and environmental politics
- Carol Wessman EBIO CIRES Research program seeks to gain insights on the understanding of feedback dynamics between ecosystem structure and function, and the influence of disturbance on trajectories of ecosystem processes
- James White ENV5 GEOL INSTAAR Global change, paleoclimate dynamics, biogeochemistry
- Mark Williams GEOG ENV5 INSTAAR Snow hydrology, hydrochemistry and biogeochemistry of high-elevation basins, nutrient cycling, and hydrologic pathways.
- Tom Yulsman JOUR ENV5 Science writing, primarily about Earth systems (geology, paleontology, climate) as well as astronomy
- Michael Zimmerman PHIL ENV5 CHA CVSP CSTPR Examining metaphysical, cultural, ethical, cognitive, political and religious dimensions of anthropogenic environmental problems

*(4-5) Do you have environment- and/or sustainability-related centers, programs, or research institutions associated with your school? If so, please provide their names and a description.*

- **CU Boulder is the nation's top university in numbers of publications in geoscience (environmental) research**, according to the Web of Science database, Essential Science Indicators subset. The data covers a ten-year, four-month period, 1 January 1998 - 30 April 2008. This same database shows CU as second in citations to the University of Washington.
- **CU is one of the nation's top three funded environmental research universities, according to the National Science Foundation** (NSF). CU's \$90.8-million in funded environmental research ranks third among the nation's universities, NSF reports. However, when Oceanography research is excluded from the total due to CU's landlocked geography, CU is ranked first in the aggregate of remaining environmental research categories, according to NSF.
- Cooperative Institute for Research in Environmental Sciences (CIRES)
  - Provides comprehensive environmental research and outreach through a variety of interdisciplinary efforts, including the work of the Center for Limnology, the Center for Science and Technology Policy Research,

the Center for the Study of Earth from Space, the Climate Diagnostics Center, and the National Snow and Ice Data Center.  
[cires.colorado.edu](http://cires.colorado.edu)

- Institute for Arctic and Alpine Research (INSTAAR)
  - Engages in a range of interdisciplinary research—including studies of human and ecosystem ecology, biogeochemistry, landscape evolution, oceanography, and climate—via a variety of research groups and facilities like the university’s Niwot Ridge Long-Term Ecological Research Site. [instaar.colorado.edu](http://instaar.colorado.edu)
- Institute for Behavioral Sciences (IBS)
  - Provides a setting for collaborative research on societal problems that transcend disciplinary boundaries, including work through its Natural Hazards Center to advance and communicate knowledge on natural hazards mitigation and disaster preparedness, response, and recovery. [www.colorado.edu/ibs](http://www.colorado.edu/ibs)
- Environmental Studies Program
  - Offers a broad, but rigorous, interdisciplinary environmental education, drawing on courses and expertise from nearly 20 participating departments and other units on campus, emphasizing the earth and natural sciences as well as the social sciences and humanities. [envs.colorado.edu](http://envs.colorado.edu)
- Center of the American West (CAW)
  - Identifies and addresses such crucial issues as multiculturalism, community building, fire policy, and land, water, and energy use. The center brings together, for meaningful conversation and interaction, people as diverse as the American West itself, and has begun a series of reports that assemble most current information on energy efficiency and conservation into accessible and practical guides for individuals and businesses in the West who want to save money and conserve energy resources. [www.centerwest.org](http://www.centerwest.org)
- Colorado Renewable Energy Collaboratory (CREC)
  - Combines the skills and capabilities of CU-Boulder, Colorado School of Mines, Colorado State University, and the National Renewable Energy Laboratory in the pursuit and advancement of renewable energy technologies in the state of Colorado. Efforts include the Colorado Center for Biorefining and Biofuels (C2B2), the Center for Revolutionary Solar Photoconversion (CRSP), and the Center for Research and Education in Wind (CREW). [www.coloradocollaboratory.org](http://www.coloradocollaboratory.org)
- Colorado Power Electronics Center (CoPEC)
  - Based in the Department of Electrical and Computing Engineering, mixes power electronics with analog and mixed-signal integrated circuit design to conduct energy research that spans the range of power management applications—from ultra-low-power energy scavenging devices, biosensors, and high-efficiency converters for portable battery-operated systems; to high-wattage wireless, computer,

- aerospace, lighting, and medical applications; to hundreds of kilowatts for wind power generation systems. [ece-www.colorado.edu/~pwrelect](http://ece-www.colorado.edu/~pwrelect)
- Renewable and Sustainable Energy Institute (RASEI)
    - Discovers, develops, and promotes new energy technologies that will transform the social, economic, legal, and political forces that influence energy use. Crosses all facets of the university, including the research and development activities of dozens of science and engineering faculty, the entrepreneurial work of the Leeds School of Business-based Transforming Energy and Markets (TEAM), the policy and law work of the Colorado Law School Center for Energy and Environmental Security (CEES), and numerous education and outreach efforts. [ei.colorado.edu](http://ei.colorado.edu)

*(4-6) Is an environment-themed class a core curriculum requirement? If yes, please provide the name(s) of the course(s).*

- All of these are core courses in A&S:
  - ANTH 2010-3 and 2020-3 Introduction to Physical Anthropology 1 and 2 (optional labs ANTH 2030, 2040)
  - ANTH 2050-4 and 2060-4 Honors: Human Origins 1 and 2 (optional labs ANTH 2030, 2040)
  - ASTR 1010-4 and 1020-3 Introductory Astronomy 1 and 2 (lab included in ASTR 1010)
  - ASTR 1030-4 and 1040-4 Accelerated Introductory Astronomy 1 and 2 (lab included in ASTR 1030)
  - ASTR 1110-3 and 1020-3 General Astronomy: The Solar System and Introductory Astronomy 2
  - ATOC 1050-3 and 1060-3 Weather and the Atmosphere and Our Changing Environment: El Niño, Ozone, and Climate
  - CHEM 1011-3 and 1031-4 Environmental Chemistry 1 and 2 (lab included in CHEM 1031)
  - EBIO 1030-3 and 1040-3 Biology: A Human Approach 1 and 2 (optional lab EBIO 1050)
  - EBIO 1210-3 and 1220-3 General Biology 1 and 2 (optional labs EBIO 1230, 1240)
  - GEOG 1001-4 and 1011-4 Environmental Systems 1 and 2: Climate and Vegetation, Landscapes and Water (lab included)
  - GEOL 1010-3 and 1020-3 Introduction to Geology and Introduction to Earth History (optional lab GEOL 1030)
  - GEOL 1010-3 and 1040-3 Introduction to Geology and Geology of Colorado (optional lab GEOL 1030)
  - GEOL 1010-3 and 1060-3 Introduction to Geology and Global Change - An Earth Science Perspective (optional lab GEOL 1030)
  - ANTH 3010-3 The Human Animal
  - ARSC/GEOL 2110-4 Physical Science of the Earth System (lab included)

- ASTR 2010-3 Modern Cosmology: Origin and Structure of the Universe
- ATOC/GEOL 3070-3 Introduction to Oceanography
- ATOC 3300/GEOG 3301-3 Analysis of Climate and Weather Observations
- ATOC 3500-3 Air Chemistry and Pollution
- ATOC/ENVS 3600/GEOG 3601-3 Principles of Climate
- ATOC 4750-3 Desert Meteorology and Climate
- EBIO 3180-3 Global Ecology
- EBIO 3190-3 Tropical Marine Ecology
- ENVS 1000-4 Introduction to Environmental Studies
- ENVS/PHYS 3070-3 Energy and the Environment
- ENVS/GEOL 3520-3 Environmental Issues in Geosciences
- GEOG 3511-4 Introduction to Hydrology
- GEOG/GEOL 4241-4 Principles of Geomorphology (lab included)
- GEOL 2100-3 Environmental Geology
- GEOL 3040-3 Global Change: The Recent Geological Record
- GEOL 3500-3 Earth Resources and the Environment
- GEOL 3720-3 Evolution of Life: The Geological Record
- GEOL 3950-3 Natural Catastrophes and Geologic Hazards
- MCDB 1030-3 Plagues, People, and Microorganisms
- MCDB 3330-3 Evolution and Creationism
- PHIL 1400-3 Philosophy and the Sciences
- PHIL 3410-3 History of Science: Ancients to Newton
- PHIL 3430-3 History of Science: Newton to Einstein

#### 1-Credit-Hour Laboratory/Field Courses

- ANTH 2030-1 Lab in Physical Anthropology 1
- ANTH 2040-1 Lab in Physical Anthropology 2
- ATOC 1070-1 Weather and the Atmosphere Laboratory
- EBIO 1050-1 Biology: A Human Approach Lab
- EBIO 1230-1 General Biology Lab 1
- EBIO 1240-1 General Biology Lab 2
- GEOL 1030-1 Introduction to Geology Lab 1
- BAKR 1600-3 Creating a Sustainable Future
- ECON 3535-3 Natural Resource Economics
- ECON 3545-3 Environmental Economics
- IAFS 1000-4 Global Issues and International Affairs
- INVS 3000-(3-4) Innovative Approaches to Contemporary Issues Through Service Learning
- INVS 3304-3 Human Rights: Promotion and Protection, an NGO Perspective
- INVS 4302/PSCI 4732-3 Critical Thinking in Development
- PSCI 4012-3 Global Development
- WMST 2600-3 Gender, Race, and Class in a Global Context

- ENVS/PHIL 3140-3 Environmental Ethics
- PHIL 3160-3 Bioethics
- PSCI 3064-3 Environmental Political Theory
- SEWL 2000-3 America, the Environment, and the Global Economy
- SOCY 2077-3 Environment and Society

*(4-7) What percentage of academic departments offer environment- or sustainability-related classes?*

- >50%

## Category 5: Purchasing

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*(5-1) Does your school have a sustainable-purchasing policy? If yes, briefly explain.*

- The assurance that all green purchases are cost competitive (using various total cost models);
- The education of ourselves, our vendors, and our campus communities for the conservation of natural resources;
- The minimization of pollution;
- The reduction of water and energy usage;
- The elimination or reduction of environmental health hazards to workers and our community;
- The support of strong recycling markets;
- The reduction of materials that are landfilled;
- The increase in use and availability of environmentally preferable products; and
- The recognition of vendors who reduce environmental impacts in their production and distribution systems or services.

*(5-3) What percentage of paper used on campus is made from at least 30% postconsumer recycled content?*

- **69.56%**
- CU has a Green Purchasing Policy and guidelines to maximize the use of environmentally preferable products like recycled paper. Through the use of these guidelines, the University gives preference to environmentally friendly products whose quality, function, and cost are equal or superior to more traditional products.

*Does your school purchase paper that is Forest Stewardship Council-certified?*

- Yes. These items are so noted on the purchasing website. Part of CU's Green Purchasing Policy and guidelines specifically addresses source reduction:
  - "Reducing unnecessary waste at the source allows the University to both mitigate the inefficient use of our natural resources and benefit economically from decreased handling and disposal costs." Some purchasing examples that minimize waste and encourage additional recycling include:

- prohibiting purchase of deep-dyed, neon paper because of its non-recyclability
- use of the use of "ExpanOS", as a substitute for Styrofoam packing peanuts. The new product is as lightweight as packing peanuts and about the same price, but is made of recycled paper and can be recycled again after use - contractual terms and conditions in CU's soft drink contract, concessions contract, and computer contracts requiring waste reduction and recycling practices as well as the use of recyclable, compostable, and recycled products.

*(5-3) Does your school have a policy to purchase Electronic Product Environment Assessment Tool (EPEAT)-certified (or similar) electronics? If yes please describe.*

- Computer RFP specifying EPEAT to bid this summer.

*(5-4) Do you have packaging agreements with suppliers that minimize waste? If yes, please describe.*

- Computer RFP specifying Dell packaging and take back requirements to bid this summer.

*(5-5) Does your school specify in its purchasing contracts that products with energy-saving features be installed or delivered with these features enabled?*

- Developing guidelines for further implementation in large capital items. Small capital (e.g. copiers) items currently enabled for duplex printing, email vs. fax receipt, auto sleep etc.

## Category 6: Transportation

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*(6-1) Does your school provide a free shuttle service around campus and town? If yes briefly explain.*

- Yes. The continuous shuttle serves primarily university-owned housing and main campus classroom areas, although all students are allowed to board. Likewise, Late Night Transit offers free bus service to the university community from local commercial and entertainment areas to campus and off campus housing.
- In addition to the campus-operated free shuttle service, in 1991 CU became one of the first of the nation's campuses to provide pre-paid universal access transit passes, allowing CU students to ride fare-free on local and regional bus service provided by the Regional Transportation District. Later in 1995 faculty and staff were similarly provided universal-access transit passes.

*(6-2) What has your school done to promote bicycling as a transportation method?*

- In addition to traditional advertising methods (print, live, internet and other presence), the university provides students, faculty and staff with access to free 48-hour bicycle rentals, a staffed self-service kiosk ("Bike Station"), enhanced bicycle travel corridors/lanes, renovated/expanded bicycle parking, and regular bicycle-advocacy events.
- Recently, in partnership with university planners and public safety enforcement officials, bicycle program staff are working to develop effective inter-modal safety solutions and to encourage responsible behavior.

*(6-3) Does your school encourage its students and employees to use public transit, carpool, or use some other form of alternative transportation? If yes, what are the incentives?*

- First, the sustainable transportation program operates a large traditional advertising program (which produces blogs, stickers, posters, events, e-mail announcements, Facebook communication, newsprint, and more). Second, few cash incentives are provided, but several options exist to reduce the logistical and financial load on those choosing car-free options. Generally speaking, students, faculty and staff have universal-access

transit passes (fare-free), access to free bicycle rentals and maintenance assistance, access to free carpool-matching software, access to recreational (winter resort) transit services, access to free late night transit services and more. In addition, the university is located within the Bicycle Friendly Community of Boulder, CO, well known for its bicycle network infrastructure and Community Transit Network.

*(6-4) Approximately what percentage of students drive to school in a car?*

- 25% (April 2008 study)

*(6-5) Approximately what percentage of faculty and staff drive to work in a car?*

- 45% (April 2008 study)

## Category 7: Waste Management

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(7-1) What is your campus current waste-diversion rate (i.e. percentage of campus waste being diverted from the landfill)?

- **36.7%**

(7-2) Does your campus provide recycling receptacles wherever there are trash cans?

- **CU was the first school in the country to “design for recycling” through the campus planning process.** Since then, significant improvements have been made to reach the “parity” goal of recycling containers next to every trash container. Currently, all outdoor containers are being optimized to match every outdoor trash container with a recycling container, while reducing the amount of overall trash containers on campus. Over 500 receptacles are included in this optimization that will achieve 100% parity this summer. Central recycling stations can be found in every building at or near existing trash receptacles. Desk side trash collection has been removed while maintaining desk side recycling collections in all buildings, thus incentivizing office recycling from faculty/staff.

(7-3) Are recycling bins readily available at large events such as football games?

- **Indeed, recycling and compost cans are ALL that are publically available at football and other sports events.** In 2008, **CU became the first major stadium in the country to remove public trash cans and establish a zero-waste goal for a NCAA Div 1 athletic stadium.** “Ralphies Green Stampede” is CU’s zero waste initiative for home football games that not only replaces public trash cans with recycling and composting containers, but works with concessions operations to reduce waste and increase recyclability and compostability of its products and packaging. The program captured over 40 tons and reached an 80 percent diversion rate from area landfills. The program was expanded to basketball as well.
- In 2009-2010, the program also:
  - Won First Place Grand Champion in EPA’s National Game Day Challenge 10.17.09
  - Implemented the use of compostable Mylar candy wrappers on candy sold in the stadium.

- Became a charter member of EPA's Rocky Mountain Greener Venue Partnership that includes several professional sports stadiums seeking to mirror CU's success.
- The program has garnered significant industry and media attention from the EPA, Stadium Managers Association, and in the *New York Times*. Many stadiums are now planning to follow CU's lead—and Frito-Lay has announced completely compostable bags for their Sun Chips line partly as a result of CU's leadership.
- Other large events on campus, such as Global Jam, The Taste of Asia, Buffalo Bike Classic, and Sabor de Latino America are held in a Zero Waste fashion, with only recycling and compost bins provided to the public. Certain events, such as the Boulder Boulder 10K, are not yet fully Zero Waste events (because of direct donations of products to support the runners), but still reach high levels of diversion (over 52% at the Boulder Boulder) through high levels of recycling and composting.

*(7-4) Does your school's compost? If yes, are compost receptacles at all or most on campus dining locations?*

- Composting is an important element of CU's zero waste strategy. Last year, over 234 tons of pre and post-consumer food scraps were delivered to a permitted composting facility. In addition to food scraps, nearly all of the CU's organic grounds debris (leaves, grass, trimmings, etc) are captured for composting. Last year over 240 tons of these materials were diverted from landfills. Instead of contributing a large source of methane gas to the atmosphere, CU prevented over 17 tons of emissions while helping improve local soil's capacity to sequester more carbon.
- Not only are all dining services equipped with composting operations, several activities are conducted to help build awareness of the importance of organics recycling:
  - CU food services for instance, offer a zero waste service where food is served on either reusable china or compostable disposable ware. Food Services staff then collects the compostable waste at the end of an event and transports it to central collection bins. "Scrape Your Plate Day" has been an annual event in the Dining Halls where tabling and displays help instill student appreciation of CU's composting efforts. Finished compost is returned to the campus grounds crews as soil amendments. Small samples are also given away periodically as an educational tool for students' houseplants.

*(7-5) Is your school committed to waste-reduction goals, such as zero-waste? Please explain.*

- **As the home of the nation's first collegiate recycling program (1973),** CU has made a strong commitment to zero waste that is reflected in a number of campus policies and programs. **CU will have a campus wide zero waste plan in place by 2012.** CU already has several buildings and athletics operations running a complete zero waste program. CU first envisioned a waste free campus in its 2004 Blueprint for a Green Campus. Since then, waste has decreased, despite record-levels of enrollment and new construction. Today, Colorado's Greening the Government initiative has set zero waste goals in the construction as well as operation of campus buildings.
- **CU has committed to achieve a paper use reduction goal of 20% by fiscal year 2011-2012 using fiscal year 2005-2006 as a baseline.** Activities that have progressed toward this goal include: conversion of all forms and processes to online equivalents, default use of double-sided copying as well as the use of interdepartmental mailing envelopes, advanced voice mail, e-memos, and Imaging Services print-on-demand capabilities. The campus has also initiated pay-for-printing at public computing labs. This program saves the University over \$750,000 per year and reduces paper consumption by more than 18 tons annually. CU will explore directing a portion of savings toward continued improvements or to help defray additional costs of paper-saving technologies or high post-consumer paper. Recycling employees are trained to monitor excessive amounts of print overruns that are collected for recycling. Departments are provided with information about waste reduction options on campus. Student government has long had a reusable cup program, which has reduced disposable cups by up to 30%. This program was recognized by the U.S. Environmental Protection Agency with the Pollution Prevention Award in 1990.

*(7-6) Does your campus administer a donation program for clothing and other used goods when students are moving out of student housing? If so, are bins located in every dormitory?*

- During student "Move Out" at the end of the Spring semester, CU holds a "Reusable Items Drive" in all of the residence halls (about 23 buildings). During this drive, donation stations are established in the lobby area of each residence hall. The donation stations area comprised of two large bins for reusable items (clothes, small appliances/furniture, bedding, etc), 1 smaller bin for non-perishable foods, and 1 smaller bin for personal care products (open products are acceptable). The drive is held for two weeks, with student staff visiting all locations on a daily basis to organize/consolidate the materials. CU partners with Habitat for Humanity

to collect the materials from each hall daily. Habitat takes the collected materials to their thrift store for sale to the public, with all proceeds benefiting low-income housing in the Boulder County area. Non-perishable foods and personal care products are taken to the Boulder County Homeless Shelter.

- Also, spare change “jugs” are placed in each residence hall office to collect any extra donated coins from the students moving out. Spare change collection benefits various charitable organizations ranging from Project CURE to Engineers Without Borders.

## Category 8: Administration

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*(8-1) Is environmental sustainability part of your institution's mission statement, guiding principles, or similar document? If so, please explain.*

- As a public institution, the university's mission statement is a part of the state of Colorado's constitution. However, the campus' strategic plan, Flagship 2030, the Conceptual Plan for Carbon Neutrality at the University of Colorado at Boulder and the update to the Ten-year Capital Facilities Master Plan are all interwoven with clear guidance for decision makers on the integration of environmental sustainability campus wide.

*(8-2) Does your school employ at least one person dedicated to overseeing campus environmental initiatives, such as a sustainability coordinator, or have a sustainability task force or committee? Is the coordinator position a part time or full-time position?*

- Eight permanent full time (FT) staff members work at the Environmental Center, including a Director, Associate Director, Recycling Program Development Director, Recycling Program Manager, Energy Program Manager, Transportation Program Manager, and Office Manager. There is also a Campus Energy Conservation Officer, who leads the Office of Campus Resource Conservation.
- The EC also employs >100 students that aggregate to ~18.7 FTE. Facilities Management department also has a FT sustainability manager, a recycling manager, and numerous partial FTE's dedicated to recycling collections etc. Housing-Dining Services has a partial FTE recycling and local/organic foods coordinator. The CU Purchasing Service Center has a FT Director of Sustainable Purchasing.
- **Total related sustainability staff is approximately 30FTE.**

*(8-3) Has your school made an official commitment to reducing its impact on climate change by setting goals of emission reductions by a certain date? If yes, does your school have a plan for achieving these reductions? If so, briefly explain the plan.*

- The campus is one of the original signatories of the American College and University Presidents Climate Commitment (ACUPCC). Our plan was filed in October of 2009.

- Carbon reduction goals and phases are as follows:
  - Governor's Executive Order Phase (2009–2012): This period is characterized by the robust and aggressive pursuit of The Greening of State Government goals detailed in Colorado Governor Bill Ritter Executive Order. Implementation efforts are being spearheaded by the Sustainability Action Teams charged by the Vice Chancellor of Administration in June 2009. The challenge is to by 2012 attain the following goals as compared to a 2005 baseline:
    - 20 percent energy intensity reduction
    - 20 percent reduction of paper consumption
    - 10 percent reduction in water consumption
    - 25 percent volumetric reduction in petroleum fuel use
    - A “zero-waste” goal for all construction projects and the operations of all facilities.

Phase 1 (2010–2020), Conservation and Cogeneration: This phase emphasizes robust conservation and cogeneration projects and programs in order to drive down CU's costs, risk, and fossil energy use. This phase is informed by the greatest level of certainty and credible planning data. This phase is benchmarked the goal of:

- 20 percent reduction in GHG emissions by 2020

Phase 2 (2020–2030), Large-Scale Renewables: The phase looks to the emergence and increased emphasis on utility-scale, renewable energy projects such as wind and solar generation. A moderate confidence level attends this phase. If successful, this phase reduces GHG emissions 50 percent by 2030. This phase is benchmarked the goal of:

- 50 percent reduction in GHG emissions by 2030

Phase 3 (2030+), Innovative Technologies: This phase attempts to credibly foresee the emergence of breakthrough technologies and strategic developments that could shape enhanced carbon mitigation opportunities. While difficult to predict post 2030 circumstances, a conservative approach to these external developments characterizes this scenario. Depending on how strongly CU can embrace post-2030 developments, various carbon neutrality dates could be targeted. This phase is benchmarked by the goal of:

- 80 percent reduction in GHG emissions by 2050

*(8-4) Has your school conducted a complete greenhouse-gas-emissions audit of its campus?*

- Yes, the campus began monitoring carbon emissions annually in 2000. Our current GHG inventory is on file with the ACUPCC.

*(8-5) Has your school achieved a reduction in total annual carbon emissions? If yes, please explain and provide the benchmark year and percentage.*

- Being an early adopter of aggressive climate action, the campus has engaged in robust energy/climate conservation campaigns for decades—even before we monitored carbon emissions. Additionally, the campus has documented decreasing energy intensity (energy/sf) since 2001. Accordingly, our per square foot carbon emissions decreased as well. As campus population has gone up through the period, we also delivered a per capita carbon emissions reduction through the period.
- Likewise, CU in 2000 became the nation's first campus to purchase offsets to mitigate climate change when our students voted to increase their own fees to pay for Renewable Energy Credits.
- CU's conservation and mitigation trend is validated by benchmarking against our peers. From the chart below it is clear that CU is well below norms in total emissions and emissions intensity when compared to a range of campuses:

<b>Campus</b>	<b>GHG Emissions per FTE Student (Metric Tons CO<sub>2</sub>e)*</b>	<b>GHG Emissions per 1,000 sq. ft. (Metric Tons CO<sub>2</sub>e)*</b>	<b>Percent Offset (percent )</b>	<b>FTE Enrollment</b>
University of North Carolina- Chapel Hill	20.9	30.9	0.0 percent	25,895
Oberlin College	17.5	18.2	0.0 percent	2,744
Georgia Tech	16.5	23.4	0.0 percent	18,742
University of Pennsylvania	15.1	25.1	35.2 percent	19,816
Cornell University	13.3	17.7	4.2	19,800
University of Arkansas	9.7	27.1	0.0 percent	14,939
University of Maryland at College Park	8.6	27.7	0.0 percent	32,467
UCLA	8.1	10.3	0.0 percent	35,612
University of Florida	7.8	21.1	0.0 percent	47,178
UC-Denver	7.7	20.9	0.0 percent	15,321
Colorado State University	7.1	22.9	0.0 percent	24,700
Oregon State University	7.0	18.7	0.9 percent	18,793
University of New Mexico	5.7	17.7	0.0 percent	20,559
UC-Berkeley	4.8	10.3	0.0 percent	33,948
University of Colorado at Boulder	4.5	14.4	4.1 percent	29,998
Arizona State University	4.4	25.0	0.0 percent	63,278
University of Vermont	4.0	9.1	0.0 percent	10,956
University of Montana	2.7	7.7	0.0 percent	11,186
Portland State University	2.3	7.2	0.0 percent	14,971

- Likewise, CU has embarked on an aggressive conservation campaign to further drive down carbon emissions and conserve resources. The following goals are taken from CU's carbon neutrality plan—and have been funded through the implementation of Sustainability Action Teams assigned to attain these goals. To date, over \$500,000 has been allocated to projects supportive of these goals:

**Table 6: Governor's Executive Order Goals and Benchmarks**

	2005 Baseline	2012 Goals (percent)	Estimated Annual Reduction Targets			
			2009	2010	2011	2012
Electricity kWh/sf/yr	13.11	-20	12.24	11.63	11.04	10.49
Steam kib/sf/yr	0.068	-20	0.060	0.058	0.056	0.055
Chilled Water ton-hr/sf/yr	3.31	-20	2.74	2.71	2.68	2.65
Water* gal/sf/yr	35.81	-10	31.30	30.68	30.06	29.46
Petroleum gal/yr	103,043	-25	95,830	89,647	83,465	77,282
Paper cases/yr	15,000	-20	14,186	13,416	12,688	12,000

\* Water reduction goals have been achieved. In 2008, water use had been reduced to 31.94 gal/sf/yr, and an additional 2 percent reduction per year is projected through 2012.

## Category 9: Financial Investments

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*(9-1) Is all information about your endowment fund publicly available? Briefly explain.*

- **CU received an “A” from the Sustainable Endowments Institute 2009 College Sustainability Report Card “Endowment Transparency” category** (see table of results below). SEI reported “The University of Colorado Foundation makes a list of endowment holdings and shareholder voting records available to the public, as per open records laws. Shareholder voting records are available at the investment office, and endowment holdings are accessible online.”

*(9-2) Does your institution have an investment-responsibility committee that considers and acts on environmental issues?*

- The CU Foundation provides its investment managers with specific environmental and social guidelines that determine proxy votes. An investment policy committee is also involved with making voting recommendations to the board of directors. This committee also includes local community volunteers and happens to have one doctoral student on the body currently.

*(9-3) Does your school make environmentally responsible investments? If so, briefly explain what they are and whether they’re made on an ongoing basis.*

- **CU also received an “A” from the Sustainable Endowments Institute 2009 College Sustainability Report Card “Investment Priorities” category.** SEI reported “The University of Colorado Foundation aims to optimize investment return and is currently invested in renewable energy funds. The foundation is also invested with managers that consider environment/sustainability factors as a primary component of their investment practices.”

## Category 10: Other Initiatives

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*(10-1) Have any of your school's students affected positive environmental change on a campus, state, or national level? If so, please describe. (To nominate a specific student for greater attention in our coverage, please email [cool.schools@sierraclub.org](mailto:cool.schools@sierraclub.org) with his or her name, accomplishments, and contact information.)*

- Christina Aalto: From training students to perform energy audits in their communities to working with White House Cabinet members to detail the importance of engaging our youth in the rapidly growing clean energy economy, Christina Aalto is dedicated to making a positive difference in the world. In her career as a student at the University of Colorado, Christina has: served as the Global Warming Solutions campaign coordinator for CoPIRG Student Chapters; interned with the EPA to initiate energy audits in National Parks; partnered with the Environmental Center and the City of Boulder to promote a student-run rental efficiency program; and is an active member with the Colorado Student Coalition, a diverse partnership of student organizations dedicated to promoting sustainability throughout Colorado.

In December, 2009, Christina was selected by the White House to represent young leaders around the country at the first Youth Clean Energy Economy Forum. During her time in Washington D.C., Christina had the opportunity to sit down with some of the Nation's most influential decision-makers, such as Secretary Jackson, Secretary Salazar, and Secretary Chu, and highlighted the importance of promoting energy efficiency on college campuses. In the summer of 2010, Christina is in line to intern at the White House to continue her energy work.

Christina is currently managing the new Student and Community Outreach for Rental Efficiency (SCORE) program that has already demonstrated great success. In the two months since the project was started in January, over 75 rental properties have received energy audits and a significant number of students have been trained to install resource-saving technologies. This initiative combines service-learning opportunities with the resources necessary to reduce consumption and improve the sustainability of local communities.

Contact: "Christina Elizabeth Aalto" <Christina.Aalto@colorado.edu>

*(10-2) Have students participated in environmental challenges or events such as the Solar Decathlon, environmental design contests, or environmental debates? If so, which events and how did they do?*

- **CU has placed FIRST in two of the four Solar Decathlon's conducted to date** (2002:1st, 2005:1st, 2007:7<sup>th</sup>, 2009: no entry)

*(10-3) Has your school set aside part of its campus as natural habitat, stipulated limited campus development, or enacted programs preserving its land? If so, please explain.*

- Yes. As part of LEED for new buildings (SSc5.1 & SSc5.2 site development; protect & restore habitat and open space), we have designated land for limited campus development. The University properties include native and natural habitat acreage that is protected from development. All new capital projects include additional acreage set aside for this purpose.

*(10-4) Does your school adhere to an indoor-air quality policy (e.g., the mandated use of nontoxic cleaning supplies)? If yes, describe the policy.*

- Yes, all buildings are built to LEED standards that require indoor air quality protection measures such as non-VOC paints, carpet adhesives, etc. Likewise, custodial cleaning supplies are Green Seal approved (GS-37), low-odor, non-toxic, etc.
- Campus pesticide use policy implemented in 2002 (<http://www.colorado.edu/ehs/pdf/pest.pdf>). "It is the policy of the University of Colorado at Boulder that unwanted pests will be managed by all persons (faculty, students, staff and applicators) utilizing the following Integrated Pest Management (IPM) procedures. "
  - Once a pest threshold is established, policy requires a treatment be identified that is:
    - Least hazardous to human health;
    - Least damaging to the environment;
    - Effective at controlling the target pest;
    - Has minimal negative impacts to non-target organisms;
    - Within available resources.
- Indoor Air Quality Committee consisting of EH&S, Facilities Management, and Housing & Dining Services. Meets monthly to review and resolve current IAQ issues.

- Use of microfiber cleaning cloths, mops, dusters, etc. (reduced chemical use and less dust) by Facilities Management custodial crews.

*(10-5) Does your school offer outdoor- or nature-based programs, classes, or extracurricular activities to students and/or faculty? If yes, please list and describe.*

#### Groups/activities

- CU WILD: Rainforest Action Group
  - Committed to preserving tropical and temperate ecosystems, indigenous peoples' rights, and the promotion of sustainable alternatives to wood products.
  - <http://www.colorado.edu/StudentGroups/cuwild/>
- CU WILD: Study Group
  - Dedicated to the preservation of Colorado's wild and primitive areas, sponsors educational programs, monitors timber sales, and provides outlets for student activism.
  - <http://www.colorado.edu/StudentGroups/cuwild/>
- CU WILD: Wildlife Initiative
  - Dedicated to the protection and recovery of wildlife with a focus on native carnivores and their habitats in the Southern Rocky Mountain eco-region and its neighboring high plains and deserts.
  - <http://www.colorado.edu/StudentGroups/cuwild/>
- Earth Education
  - Helps elementary and middle school students gain a better understanding of environmental problems and solutions through outdoor programs, classroom projects, or planning and discussion sessions. <http://ecenter.Colorado.edu/earthed>
- Environmental Center
  - The CU Environmental Center (E-Center) is the nation's oldest, largest, and most accomplished student-run environmental center, which educates, activates, and inspires the campus community to understand and engage in local and global environmental issues. With eight professional staff and over 100 student staff, dozens of volunteers and interns; and numerous programs that improve sustainability for the campus, community, and planet, the E-Center is among students' most popular organizations. Award-winning services include CU Recycling; climate, energy and water conservation efforts; student bus pass and bicycle programs; numerous events; environmental justice initiatives; and a library of books, periodicals, and videos.
  - <http://ecenter.colorado.edu/index.html>
- UCSU Environmental Board
  - The nation's largest student-run Environmental Center is run by a board of seven students and two non-students, with an unlimited number of interested, non-voting members.

- <http://www.Colorado.edu/ecenter/>
- University of Colorado Student Union
  - UCSU is the student body government for the University of Colorado at Boulder. UCSU creates, implements and oversees a \$30 million budget generated by student fees and other revenue for the operation of UCSU Cost Centers. UCSU also serves as the liaison between the student body and university administration. Three branches, an executive, a legislative and a judicial, are governed by the student-adopted Constitution. Positions include a Sustainability Director.
  - <http://www-ucsu.colorado.edu/webber/information.cfm>
- CU Biodiesel
  - CU Biodiesel is a student and community organization dedicated to education and implementation of petroleum-free fuels  
<http://www.cubiodiesel.org>
- Colorado Public Interest Research Group (COPIRG) student chapter
  - COPIRG promotes the use of renewable energy sources, advocate for affordable higher education, and address hunger and homelessness.
  - <http://www.copirgstudents.org>
- CU Recycling
  - One of the nation's leading campus recycling programs. A variety of volunteer, research, and internship opportunities exist.  
<http://www.Colorado.edu/recycling>
- Environmental Studies Club
  - Working to gain financial, administrative and faculty support, and curriculum reforms for the University Environmental Studies Program. The club also helps Environmental Studies students find jobs and network with program alumni.
  - <http://www.Colorado.edu/envirostudies>
- Environmental Law Society
  - Gives law students opportunities to immerse themselves in the larger natural resources law community that Colorado has to offer. Organizes service outreach activities and outdoor adventures.  
303.492.8073
- Environmental, Population, and Organismic Biology Club
  - Offers field trips, hosts guest speakers, presentations, panels, and seminars related to diverse aspects of biology. Students experience first-hand the branches of biology and the careers, research possibilities, and volunteer opportunities available
- Green Teams
  - Educate off-campus students about community recycling programs, composting, energy and water conservation, and other ecologically sound household practices. Facilitated through the Environmental Center [http://ecenter.colorado.edu/get\\_involved/volunteer.html](http://ecenter.colorado.edu/get_involved/volunteer.html)
- EcoReps

- Peer-to-Peer education program for students living in Residence Halls and Greek houses. Eco-Reps learn about recycling, sustainable transportation, energy and water conservation, and other environmental topics and the create education and outreach programs for their Hall to help other residents to be more environmentally engaged. Facilitated through the Environmental Center [http://ecenter.colorado.edu/get\\_involved/volunteer.html](http://ecenter.colorado.edu/get_involved/volunteer.html)
- Population Connection
  - Focuses on local population-related issues such as human health, human rights, and environmental degradation. Population Connection is the national grassroots population organization that educates young people and advocates progressive action to stabilize world population at a level that can be sustained by Earth's resources.
  - <http://www.colorado.edu/studentgroups/PopulationConnection/index.html>
- STAMP
  - Promotes non-motorized and mass transportation alternatives to the single occupancy automobile. Strives to motivate CU, Boulder, and the surrounding communities to embrace non-automobile transport as a solution to environmental, political, economic, and social problems created by the automobile.
- Student Environmental Action Coalition (SEAC)
  - Works on environmental justice issues, community service, education, and networking, and sponsors speakers and action-oriented events. <http://ucsu.Colorado.edu/~seac>
- CU Community Energy Connections
  - Student home energy auditing program for low-income residents in the extended Boulder area. Provides education and access around energy efficiency as a means to achieve self-sufficiency and create a broader awareness of and access to solutions that make economic, social, and ecological sense. <http://cucec.org>
- CU Going Local
  - Focuses on relocalization of food resources by promoting local food production in urban gardens, on campus, and on “the Hill” area next to campus. <http://cugoinlocal.com>
- Green Cord Graduation Pledge
  - Graduating seniors pledge commitment to social and environmental responsibility upon commencement and entrance into life beyond college.
  - <http://www.colorado.edu/studentgroups/scc/graduationpledge.html>

## Events

- Meeting the Global Climate and Energy Challenge, August 22-23, 2008
  - <http://www.colorado.edu/climateenergy/news/events.html>

- 12th Rocky Mountain Sustainability Summit Feb. 11-13, 2009
  - The biannual Rocky Mountain Sustainability Summit provides a learning and networking forum for participants from campuses in the Rocky Mountain region (CO, NM, UT, WY, MT, ID, AZ) to advance sustainability. Features keynotes by leading experts, campus administrators and government officials.  
<http://ecenter.colorado.edu/rmss2009>
- ELEVATE! The Future of Development, Climate Change and the New Frontiers of Urban Development February 26-27, 2009
  - More than 30 of the nation's leading thinkers and practitioners in real estate, law, business and public policy gathered for a new symposium about sustainable land use and real estate development. [http://www.lisc.org/docs/events/elevate\\_2009.pdf](http://www.lisc.org/docs/events/elevate_2009.pdf)
- Energy Initiative Research Symposium November 17, 2008
  - Hosted in partnership with regional federal labs.
  - <http://ei.colorado.edu/index.php?id=177&pid=50&page=2008percent20EIpercent20Researchpercent20Symposiumpercent20andpercent20Seedpercent20Grantpercent20Competition&parent=64>
- Boulder Chapter of the United Nations
  - Millennium Development Goal #7, "Ensure Environmental Sustainability," specifically addresses the need for development that sustains natural resources and biodiversity, protects water supplies and increases the availability of safe drinking water where good water is scarce and water-borne disease is common. It is clear that achieving these goals will depend upon solutions to climate change, solutions based on science, new technologies and political will.
- 61st Annual Conference on World Affairs April 6–10, 2009
  - Forum on international affairs, media, science, diplomacy, technology, environment, spirituality, politics, business, medicine, human rights, and more.
  - <http://www.colorado.edu/cwa>
- The 2009 conference on World Affairs included a keynote address by James Hansen entitled, "Climate Threat to the Planet: Implications for Intergenerational and Environmental Justice," April 9, 2009.
- Mildred Dresselhaus, MIT, "Advanced Materials on Our Energy Future: Breakthroughs and Challenges" April 30, 2009
- Thomas Friedman, "Hot, Flat and Crowded: Why we need a Green Revolution – and How it can Renew America" February 16, 2009.

## Category 10: Other Initiatives, continued

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*(10-6) What specific actions has your school taken to improve its environmental sustainability since spring 2009? Please list all improvements.*

- Chancellor's Exploratory Committee on Curriculum: To further the goal of strengthening sustainability in the curriculum, Chancellor DiStefano in 2009 approved the establishment of an exploratory committee of faculty members to develop the tenets and plan for a sustainability initiative. This committee is comprised of teaching and research faculty from nearly all the colleges at the university. Specific charges for the committee include:
  - Complete an inventory of campus resources, especially research resources and funding sources, but also including teaching, classes, etc.
  - Complete an inventory of leadership programs nationally and internationally, helping to identify and define CU niche/role.
  - Develop curriculum options and alternatives related to Sustainability at CU, building upon (not instead of) current strengths (undergraduate certificates, minors, majors, graduate program(s), Program in Writing and Rhetoric, and Residential Academic Programs) and possible funding sources.
  - Form faculty working groups: Research and Funding; Undergraduate Certificate; Graduate Collaboration; PWR curriculum; Residential Academic Program/Department of Housing and Dining Living and Learning collaborative efforts; and Outreach and Colorado Engagement options.
  - Identify strategic gaps and synergies worthy of investment for multiplier effects.
  - Develop an understanding of the economics, and what success looks like for evaluation purposes.

Additionally, faculty have identified the following methods to accomplish infusion of climate change into the curriculum:

- Assess the current curriculum as it relates to climate by conducting an inventory and gap analysis of all existing course and other educational experiences available to all students, as well as courses that require prerequisites that relate to climate change and sustainability .
- Establish a baseline of existing attitudes and awareness of students, faculty and staff about climate change and sustainability topics in order to develop metrics and strategies to measure student gains.
- Establish an academic coordinator whose primary responsibility is to inventory, coordinate, and integrate existing programs across campus, and to support professional development for faculty for the integration of CU Boulder energy and climate research into the classroom.

- Develop campus wide incentives and programs to encourage faculty across the institution to address sustainability in their courses, such as the addition of sustainability categories on the Faculty Report of Professional Activities (FRPA), support for course development, cross-disciplinary course development, and recognition of such activities on annual evaluations
  - Incorporate measurable graduate competency standards for undergraduates that relate to climate and energy science (addressed through the science course required for graduation) as well as the social, environmental, and economic challenges that current students and future generations will face in this century and beyond.
  - Accelerate the implementation of student life educational initiatives related to climate change and sustainability, beginning with new student orientation and continuing through Residential Academic Programs/Flagship 2030, and post-residence campus life.
  - Engage students in city and community activities that support on-campus, city, county, and state efforts in carbon neutrality and sustainability.
- Education for sustainability: A new and very unique position has been created and funded aimed at integrating CU's obviously green operational platform with educational efforts in and out of the classroom. This "Education Outreach Coordinator," (a tenure-track faculty member) will help:
    - develop learning modules that use CU campus sustainability efforts and green facility platforms as case studies, learning platforms, and contextual references for related coursework campus wide;
    - provide professional development for campus staff and faculty in an effort to make the "campus as a living laboratory;"
    - develop direct student sustainability-leadership training (non-credit) as part of Continuing Education's sustainability certificate program;
    - work with HR to develop sustainability training modules for UCSU cost center staff and other campus personnel;
    - work with community partners to better support educational efforts in off campus student neighborhoods that increase student participation in sustainability efforts while leveraging town-gown assets.
  - Non-traditional education for sustainability: Continuing Education this year launched a Certificate in Sustainable Management program that has become an instant success. Open to credit or non-credit students, the program offers hands on raining from mainstream faculty.  
<http://conted.colorado.edu/programs/sustainable-practices/sustainability-management/>
  - Sustainability assessment: CU this year joined numerous campuses as Charter Participants in AASHE's new Sustainability Tracking and Ratings

System (STARS). CU will submit its rating this year.

<http://www.aashe.org/STARS>

- Alternative transportation: Developing a more organized campus sustainable transportation program that spans departments with staff who collaborate on transportation initiatives. A combined sustainable transportation budget and program plan helps to develop long-term strategies and funding. Also, small programs development continues, including semester-long bicycle rentals, expanded Late Night Transit services and expanded Ski Bus options. A charging station for electric hybrid vehicles will become operational in 2010. Additional hybrid-electric vehicles are targeted for the fleet and car share programs.
- Alternative fuels: Four of 6 recycling and trash collection vehicles are running on minimum 20% Bio-diesel. 2 of 3 special events collection vehicles are electric; one of these is solar powered. Campus wide, the vehicle fleet is moving to hybrids/alternative fuel vehicles in order to meet the 25% fuel reduction goal by 2012.
- Materials management: Over the last year, the CU Recycling program has taken several steps to improve diversion rates and lead CU to a Zero Waste campus. For instance, recycling collection operations have been consolidated into a “Dual Stream” system, providing two main recycling containers across campus for “Papers” and “Containers”. This new system makes recycling papers easier for the end user, while still maintaining the highest quality for the papers that are exported from campus to be recycled. Another example is the post-consumer composting pilot program being held in the CU student center (UMC). This pilot has focused on capturing paper towels from the bathrooms for composting, along with collecting compostable disposables that are served in the grill area. This building serves as an example that can be scaled up to fit all buildings campus wide. Zero waste offices have been piloted in E-Center and UCSU—resulting in diversion rates >90% and office without any trash containers. This program will scale up for campus wide implementation in 2010.
- Master Plan Revision: CU included sustainability as one of the cornerstones of the revision process on the Campus Master Plan. In 1990, CU’s Master Plan was the first in the country to detail provisions for waste reduction, reuse, and recycling in the design, construction, and occupancy of a building or major remodeling project on campus. In the current review process, CU is expanding these provisions to integrate a zero-waste infrastructure including an on-campus compost system capable of processing all campus-originated pre-and post consumer organics as well as a new materials management facility sufficient to integrate operational needs with emerging research and community engagement activities.

- Computers to Youth program: In the past year, CU has launched an ongoing “Computers to Youth” program that provides middle and high school students from low-income communities around Colorado with upgraded computers and basic computing programs. Surplus computer equipment is gathered, tested, and re-furbished to original specifications and loaded with the latest software to assist students' academic achievement. On-site instruction and follow-up mentoring is provided by CU. These CU student mentors also provide ongoing assistance and encouragement throughout the year. Two pressing issues are addressed through the program: the growing amount of waste from computers and the "digital divide" (the relative inaccessibility to computing and communication technology).
- Upstream Carbon Leadership: The carbon that CU emitted from discarding over 3,400 tons of trash in FY08 year was just the tip of the iceberg. For each ton of discarded products and materials landfilled, CU indirectly contributed to the production of about 71 tons of manufacturing, mining, oil and gas exploration, agricultural, coal combustion, and other discards (241,400 tons total). Increasingly, there is a need to understand the interconnectedness between CU as a consumer and the many companies that produce the materials CU uses. Accordingly, CU has begun to demonstrate leadership by trying to lower emissions in its supply chain. Initial progress has focused on trying to measure supply chain emissions by working more closely with the schools suppliers, sharing information, testing emerging measurement methods, and where practical, leveraging purchasing decisions.
- Energy: a new program to incentivize and fund the retirement of obsolete lab fume hoods has been funded and implemented. Five new Solar PV installations have taken place—including substantial PV for climate scientists studying climate change at the Mountain Research Station on the Continental Divide.
- IT improvements: data center conservation and consolidation – incorporating sustainability into IT strategic plan
- Climate: A \$500,000 Energy and Climate Revolving Fund has resulted in >\$40K/year energy savings and tons of CO2 reduced—and has been expanded into the purchase of ‘green fleet’ vehicles.
- Pollution prevention: All mercury (Hg) containing light tubes & bulbs recovered for recycling regardless of mercury content (includes green tip bulbs). 6-8,000 bulbs per year. Not required by law.
- Reuseables: Tons of surplus building materials (paint, doors, light fixtures) donated to not-for-profit organizations.

- IPM: Integrated Turf Management plan features non-toxic responses:  
<http://www.colorado.edu/facilitiesmanagement/facilities/grounds/documents/IntegratedTurfMngmtPlan.pdf>

(10-7) Please use this space to address any other unique or interesting sustainability initiatives that have not been previously mentioned:

- During summer 2009, the Vice Chancellor for Administration created the Executive Sustainability Steering Committee. This group includes the Vice Chancellor for Administration (VCA), the Facilities Management/Resource Conservation Officer, the director of the Environmental Center, the University of Colorado Student Union sustainability director, and the executive director of Housing and Dining Services. This group meets once a month and creates a forum for coordinating and communicating sustainability activities; providing quality control and consistent standards; and making executive level decisions when necessary.
- In addition, the VCA with the assistance of the Executive Sustainability Committee created Sustainability Action Teams (SAT) – smaller working groups that focus on plans and activities to meet individual goals – energy, water, materials and petroleum. Additionally, these groups have been encouraged to invite other members of the campus community to join their team. On a quarterly basis, all of the SAT meet together to discuss successes, challenges and progress; they also submit updates regarding each goal.
- A “challenge” fund was created by combining funding from the VCA Plant Fund and from the campus. Each team was challenged to submit a detailed proposal requesting funds that would assist in reaching both the goals of the Presidents Climate Commitment and the statewide goals set by the governor. Project proposals were reviewed by the Sustainability Support Group (Environmental Center Director, Conservation Officer and the VCA Assistant to – responsible for managing day to day issues and presenting any issue that needs executive action) and recommendations were made regarding each proposal to the Executive Committee.
- The funded projects include:
  - Energy updates to labs, data centers and dining hall kitchens
  - Water conservation projects in restrooms, dining hall kitchens, and water re-use
  - Outdoor zero waste stations
  - Green vehicle revolving fund
  - Copy and print management, and

- Financial resources to encourage the upgrade of appliance purchases to Energy Star
- Recently, **the VC’s responsibility has been expanded to “Vice Chancellor for Administration and Sustainability.”** The VCAS, working with the Provost, has created the Sustainability Steering Committee, a decision making committee – replacing the Executive Sustainability Steering Committee – representing all areas on campus that in some way are involved with sustainability. The committee has been charged with creating the campus’ sustainability plan, charting the course for the campus beyond the Conceptual Plan for Carbon Neutrality, funding distribution, fund raising, and communications.