Climate Action Plan

Living Document

Naropa University

Boulder, Colorado

Prepared by:
Naropa Sustainability Council

March 2013

Acknowledgments

Many thanks to past and present Naropa Sustainability Council members, as well as community members, for their leadership and support in developing and reviewing the Climate Action Plan:

- Kai Abelkis, Sustainability Coordinator, Boulder Community Hospital
- Aaron Cook, Director of Facilities and Operations, Naropa Sustainability Coordinator
- Costen Aytes, Landscape Manager, Facilities and Operations
- Phil Battos, Alumnus
- Shaun Bernhardt, Alumnus
- Ayries Blanck, Undergraduate Student, Environmental and Peace Studies
- Jennifer Bohn, Alumnus
- Tina Christopoulos, Graduate Student, Transpersonal Counseling Psychology
- Jon Dyer, Office Manager and Sustainability Assistant, Facilities and Operations
- Sandy Goldman, former Vice President, Operations
- Christopher Hormel, Trustee
- MacAndrew Jack, Director, Graduate School of Psychology
- Nathaniel Janowitz, Alumnus
- Jessica Johnson, Alumnus
- Holly Kellum, Alumnus
- Dave Kerr, Alumnus
- Paul Montgomery, former Transportation Coordinator
- Anne Parker, Professor, Environmental Studies
- Miguel Pena, Graduate Student, Environmental Leadership
- Noah Philips, Alumnus
- Don Rasmussen, former Director, Facilities and Operations
- Jesse Seavers, Alumnus
- Lynn Tindall, former interim Director, Facilities and Operations
- Jared Urchek, Alumnus

Special thanks to the leadership of past Naropa presidents Thomas B. Coburn, 2003-2009, Stuart C. Lord, 2009-2011, John W. Cobb 2011-2012

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Executive Summary

Climate neutrality is essential for the survival of humankind. And - it's not enough.
It's time for humanity to move beyond neutrality and into positive action
to create and support physical and social climates conducive to peaceful and joyful co-existence.
To do this, we need to educate ourselves and each other, in a spirit of constant enquiry,
to explore not only the challenges but also the huge opportunities.
Education needs to be focused on enquiry and action, rather than received knowledge."
General Secretary Marilyn Mehlmann, Global Action Plan International

Naropa emerged as a leader in climate action by becoming one of the first universities in the nation to offset 100% of its electricity use with wind power in 1998. Naropa's longstanding dedication to environmental stewardship and climate action was more formalized in 2007 when former President Thomas Coburn signed the American College and University Presidents' Climate Commitment (ACUPCC) thereby officially committing Naropa University to climate neutrality. In the 2008 Strategic Plan, Naropa adopted an aspiration to "model a socially, economically and ecologically sustainable working and learning environment through its facilities and its practices." And in 2012 Naropa's Board of Trustees adopted a Statement of Commitment to the Practice of Sustainability that further solidified its climate neutrality and sustainability aspirations rooted in contemplative education and action. Naropa University is a leader in the community and is excited to take a next step toward becoming a principal player in the journey toward climate neutrality.

Shortly after Naropa signed the ACUPCC, the Green Team (now the Naropa Sustainability Council) formed to develop a Climate Action Plan (CAP) to achieve climate neutrality – zero net contribution to climate change. The Naropa Sustainability Council released the first CAP draft in 2011. The first CAP draft articulated myriad mitigation strategies for moving forward to achieve climate neutrality.

The CAP is a living document. It has and will continue to be a work in progress that can be revised, enhanced, and expanded as new technologies emerge, different stakeholders are engaged, and the university moves along its path of climate neutrality. This document represents the latest iteration of the CAP and the beginning of Phase II in the process of plan development.

Planning, Implementation Phasing, and Success to Date

Naropa's CAP development involves both planning and implementing simultaneously through a series of three phases. Based on our current phasing strategy Naropa's CAP process is currently at the end of Phase I. Phase II suggests an implementation process to identify and prioritize emission reduction projects so that we may move forward to implementation in Phase III.

Campus Emissions

Naropa's electricity and natural gas related emissions have decreased over the past three years by 8.56% due to the implementation of numerous energy conservation and efficiency measures. Emissions are tracked through conducting greenhouse gas (GHG) inventories which Naropa has been doing since 2008. The GHG inventory is the primary metric by which to measure CAP progress.

Education & Research

As an educational institution of higher learning, Naropa University ought to take very seriously its commitment to educate students, faculty, staff, and the larger community about the importance of climate neutrality and the methods for achieving it. Individual responsibility, reflected in behavior change, and awareness-raising will be promoted, university core classes will work to incorporate climate and environmental responsibility, campus events will seek to solicit and provide opportunities for participation in zero waste efforts, and opportunities may be made available for internships, service learning, and volunteering in the renewable energy production and climate mitigation fields.

Community Outreach & Collaboration

Naropa University will strive to actively engage with other organizations in Boulder and beyond seeking to become climate neutral. Naropa University will support the positive work of other organizations while reaching out to the community to provide examples, inspiration, and guidance in climate mitigation. Naropa will strive to build partnerships to bring about collective climate neutrality.

Financing

Naropa University will aspire to make climate neutrality a priority in its budgeting decisions. Funds will be needed to invest in the upgrades and purchases necessary to begin eliminating carbon-producing energy from Naropa's campuses. Funds may be raised by reinvesting savings realized through conservation and mitigation strategies. Other examples of how revenue may be generated include: creating a sustainability fund as an option for donors and granting foundations, initiating a student green fee, and instituting a carbon fee on parking permits.

Introduction

This plan is intended to be a guiding document to provide the university with an overview or "road map" to achieving climate neutrality by 2040 or sooner. Realizing this goal will require thorough planning and implementation of practical mitigation strategies and the integration of climate awareness and sustainable values into the social fabric and educational climate of Naropa University.

As stated in the university's mission statement, Naropa "nurtures in its students a…sense of purpose that accompanies compassionate service to the world…Ultimately, Naropa students explore the inner resources needed to engage courageously with a complex and challenging world. A Naropa education prepares its graduates both to meet the world as it is and to change it for the better" (See Appendix A). Naropa University is a leader in the community for activities supporting social and environmental responsibility. In order to maintain that important role in the community, Naropa University must act boldly to navigate the quickly changing landscape of carbon mitigation and environmental stewardship.

This plan defines the actions needed for Naropa University to operate in accordance with its mission and reputation as it relates to sustainability. The steps delineated here will ensure that the university's policies and practices continue to move the organization toward climate neutrality and support its stated value of environmental responsibility. Through the implementation of this plan, Naropa University will benefit the community and the planet through collaboration with other effective agents of change, and will also realize greater efficiency in operations, hedge against rising fuel prices and achieve other economic benefits.

This plan should be considered a "living document," for it will grow, develop, and expand as circumstances change and as those who execute the plan enrich its contents. This plan will also integrate new regulations, technologies, and re-order, or modify priorities as necessary. While this document specifically addresses carbon neutrality for the purposes of the ACUPCC, Naropa University may, in the future, develop an overarching Sustainability Plan of which the current plan may be an integral part. A Sustainability Plan would address issues beyond carbon neutrality such as water conservation, food sourcing, social justice, etc.

Vision

Naropa University seeks to integrate environmentally sustainable practices into both the shared educational experience of Naropa students and faculty, and the daily operations of the university by generating zero net greenhouse gas emissions.. The university seeks to be a leader in the community by ultimately having negative greenhouse gas emissions.

Principles

Conservation, Efficiency, & Mindful Purchasing
As a first step toward achieving the goal of a carbon neutral campus, Naropa University will strengthen its commitment to the conservation and efficient use of resources, particularly in terms of energy use and through green building and renovation practices The University will also actively endeavor to reduce consumption in general, purchase carbon neutral and environmentally-friendly products whenever feasible.

Data Tracking
Energy and cost savings will be closely monitored so that monies saved through reduction efforts may be accounted for and emissions reductions can be attributed to specific projects.

Culture of Individual Responsibility
In order to achieve the goal of climate neutrality, Naropa University will seek to build institutional support and student, staff, and faculty participation in many efforts to this end. As Naropa University embraces the spirit of the ACUPCC, everyone associated with the university's community will be encouraged to knowingly begin their own personal journey toward a more environmentally-conscious lifestyle.

Education
Integrating sustainability into the core learning curriculum as well as the educational climate and social fabric at Naropa University is a key component of all reduction strategies.

Direct Emissions Reductions
Carbon offsets will be considered secondary to tangible steps toward achieving carbon reduction goals and will increasingly account for less of our total emissions reductions over time until we are 100% renewably powered with no offsets. Offsets are a temporary solution.

Planning, Implementation Phasing, and Success to Date

The ongoing CAP development process is described by the major activities that have or will occur in the following phases:

I. Phase I

November 2007 – Current

- Institutional Commitment Established – Naropa signs ACUPCC
- Institutional Structure and Support – Naropa Sustainability Council (NSC) forms
- Naropa Sustainability Council hires consultant, Kai Abelkis, to help draft CAP
- Greenhouse Gas (GHG) Emissions Inventories Conducted (2008, 2009, & 2010)
- Preliminary Identification of Mitigation Opportunities Completed (See Appendix B)
- First CAP Draft Compiled and Submitted (Feb. 2011)
- NSC continues to develop CAP with guidance from President's Office (Fall 2012-Spring 2013)

II. Phase II

PLAN FOR IMPLEMENTATION PROCESS

- NSC will maintain a list of potential emission reduction projects (See Appendix B), which will be submitted by May 15 each year to the Vice President for Business Affairs and Chief Financial Officer (CFO). The CFO will review the list of proposals with the Director of Facilities and Operations to put forward any requests for proposal that may be required, and shall prepare an annual sustainability strategy. This strategy, informed by the recommendations of the Naropa Sustainability Council, shall provide the direction for creation of the facilities operational budget to be submitted to the University Budget Committee, and shall inform annual capital planning. This annual sustainability strategy will be governed by the university criteria for budget management.

III. Phase III

- Implement Process defined in Phase II
- Modify climate neutral target date (if necessary)

POTENTIAL PATH TOWARDS REACHING CARBON NEUTRALITY

a. Mitigation Project Matrix

Once the campus-wide energy and lighting audits and renewable energy technologies studies are complete, a comprehensive project matrix that enumerates project cost, annual savings, simple payback, and emissions reductions for every project will be constructed.

b. Emissions Reduction Trajectory

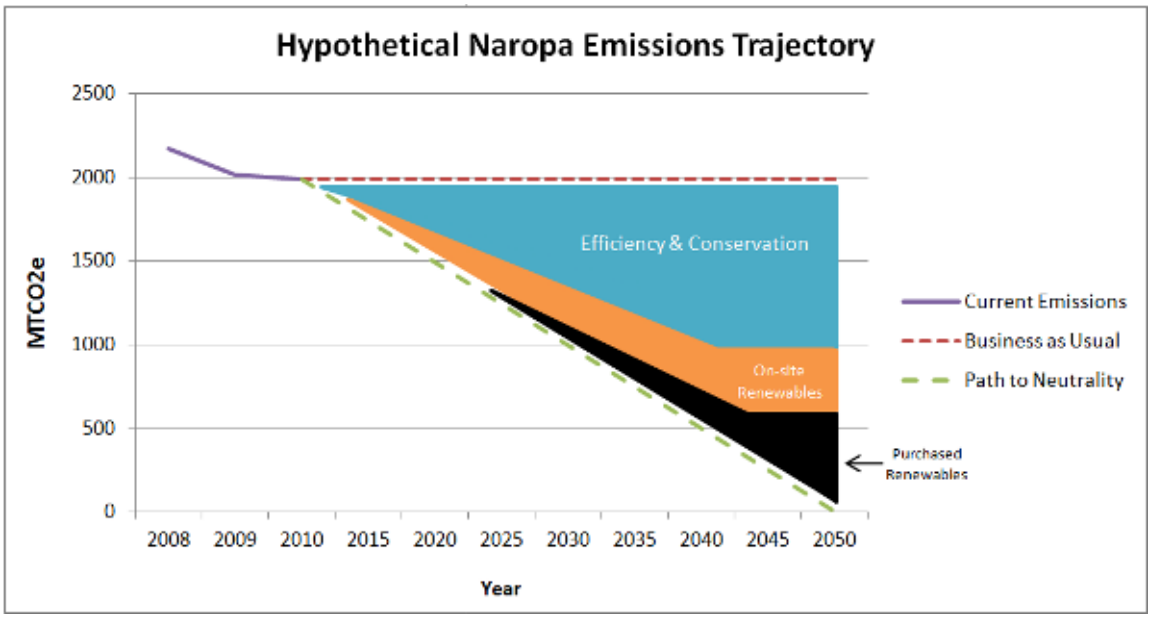
A possible emissions reduction trajectory or path will be created based on the cumulative emissions reductions calculated in the project matrix. This will be a visual representation of the journey Naropa is embarking upon – the path from "business as usual" to climate neutrality (See Figure 1). This trajectory will be formatted in such a way that actual data can be added for

comparison purposes and will include a graph illustrating the various categories of emissions and emissions sources.

c. Interim Goals and Target Dates

Interim goals and target dates indicating specific actions to be taken and the measurable results anticipated by specified dates will be set. The timeline will include contingency plans and enough flexibility to be adjusted according to market changes, technological advances, and product availability. Early reduction efforts will likely focus on conservation and efficiency. Later, on-site renewable energy and green energy purchasing will become part of the mix.

Figure 1: Hypothetical Naropa Emissions Trajectory



IV. Successful Emissions Reduction Projects to Date

Naropa has seen a notable reduction in emissions over the past three years by 8.56%. "Table 2: Naropa GHG Emissions Trends Breakdown 2008-2010" on page 12 summarizes the reductions. The reductions were calculated from annual GHG emissions inventories. The following are several projects that contributed to the reductions:

- Snow Lion dormitory outdoor lighting retrofit - replaced 50, 60 watt wall mount lights with 9 watt 4 pin fluorescents and 20, 32 watt magnetic fluorescent ceiling lights with two 15 watt electronic fluorescents.
- Retrofitted Allen Ginsberg Library lighting to 28 watt T-8 fluorescent lamps
- Retrofitted Nalanda Campus classroom lighting to 28 watt T-8 fluorescent lamps
- Retrofitted Administration Building lighting to 28 T-8 watt fluorescent lamps
- Retrofitted exterior lighting to compact fluorescent lamps
- Installed new energy efficient lighting in the Arapahoe Student Center
- Performed HVAC preventive maintenance to insure energy efficiency and reduce mechanical repairs
- Installed 1.3kW solar powered photovoltaic system to power the Greenhouse and Print Shop
- Insulated all heating and domestic hot water pipes in all mechanical rooms

Campus Emissions

Climate neutrality is characterized by having zero net emissions from greenhouse gases (GHG), primarily carbon dioxide (CO2). Naropa emits GHGs into the atmosphere directly through burning fuels for heat and indirectly through purchasing electricity as well as several other activities.

I. Types of Emissions

There are several types of emissions that are tracked:

Scope 1

Emissions associated with direct, on-site sources such as boilers, campus fleet vehicles, and refrigerants.

Scope 2

Indirect emissions associated with purchasing electricity, and other emissions producing services.

Scope 3

All other kinds of indirect emissions including those associated with commuting, solid waste, and air travel.

II. Inventory

A greenhouse gas (GHG) inventory involves calculating all the emissions associated with Scopes 1, 2, and 3 for a fiscal year. GHG inventories are the sole metric or indicator of Naropa's progress in reaching climate neutrality. The goal is to have a net inventory of zero. Inventories will continue to be done annually to track progress. All GHG emissions data are expressed in metric tons of CO2 equivalent (MTCO2e). Naropa uses the Clean Air-Cool Planet Campus Carbon Calculator emissions coefficients to make calculations. Figure 2 and Table 1 depict Naropa's emissions by source and scope for 2010 (fiscal year 2009-2010).

Figure 2: Naropa GHG Emissions by Source – 2010

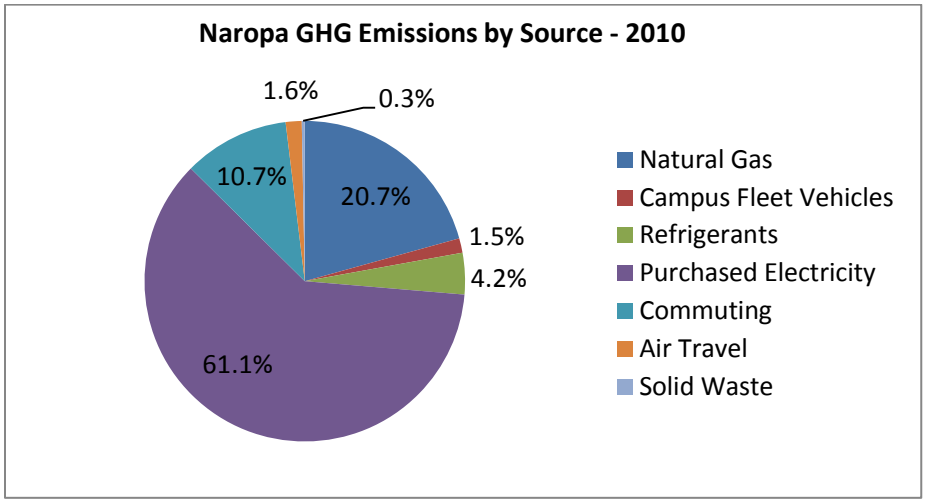


Table 1: Naropa GHG Total Emissions Breakdown by Source and Scope – 2010

Scope 1	MTCO2e	% of Total
Natural Gas	411	20.7
Campus Fleet	29	1.5
Refrigerants	83	4.2
Scope 2		
Purchased Electricity	1,213	61.1
Scope 3		
Commuting	212	10.7
Air Travel	32	1.6
Solid Waste	6	0.3
Total Emissions	1,986	100

III. Trends

Naropa has been tracking GHG emissions since 2008. In that time, an 8.56% reduction in emissions has been observed. Figure 3 depicts Naropa's emissions from 2008 to 2010 and Table 2 depicts where and by how much reductions occurred.

Figure 3: Naropa GHG Emissions 2008-2010

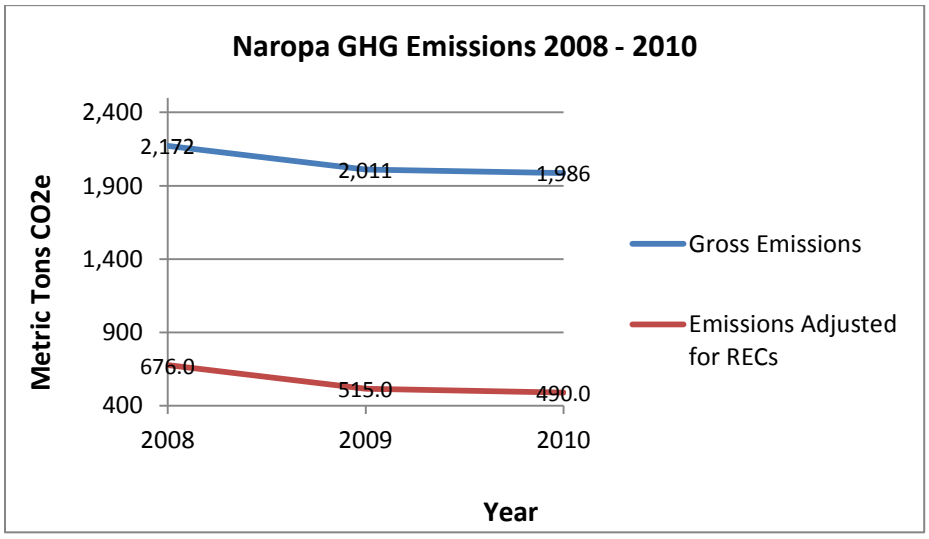


Table 2: Naropa GHG Emissions Trends Breakdown 2008-2010

Reductions	MTCO2e (% of total)
Natural Gas	33 (1.52%)
Electricity	89 (4.1%)
Commuting	77 (3.55%)
Air Travel	3 (0.14%)
Increases	
Campus Fleet	16 (0.75%)
No change	
Solid Waste	n/a
Net Reductions	186 (8.56%)

As seen in Table 2, emissions reductions occurred for natural gas, electricity, community, and air travel. The decrease in electricity and natural gas are due to conservation and efficiency projects that have occurred in the last three years. Emissions associated with community are variable as they are gathered by a survey that changes depending on who participates; albeit, it is noteworthy. Perhaps more students, faculty, and staff are utilizing Naropa's alternative transportation opportunities. Reductions in air travel means that fewer people flew for university related business. This may or may not be attributable to increased use of teleconferencing and other such strategies to reduce air travel.

Increases in emissions seen in Table 2 are from Naropa's campus fleet vehicles having consumed more fuel over the last three years. In fact, the 0.75% increase actually represents a doubling of fuel use. Such a trend must be analyzed and not repeated. Actions taken thus far to mitigate the fleet fuel consumptions include reducing the net total of vehicles in use by two and establishing individualized fuel use accounting for all remaining vehicles and equipment.

Education & Research

Naropa University can have a tremendous impact both on its own campuses, and in the greater community and society. It can do this by not only achieving climate neutrality, but by simultaneously nurturing the responsibility that each student, faculty member, and staff member personally has toward the earth's precious resources. It is paramount that we recognize the very existence of human beings is directly linked to the health of the environment and requires a mature relationship toward natural resources.

Naropa University will strive to incorporate climate neutrality and sustainability across the curriculum.

Naropa University is not a research institution, and is therefore limited in its ability to conduct full scale scientific research; however, students in Environmental Studies Department classes are encouraged to explore and research topics related to carbon neutrality and Independent Study opportunities exist for students of all disciplines to carry out such research. Naropa University's initial adoption of wind power, installation of an on-campus greenhouse, adoption of a fleet of 100 bicycles for campus community use, and many other such initiatives are the results of student research and projects. These types of research endeavors will be encouraged.

The university will track actions taken, progress made, and results experienced in its efforts toward climate neutrality; and the university is glad to share these data with other universities to contribute to the growing body of knowledge and experience in the community.

I. Sustainability across the Curriculum

Naropa formed a Sustainability Across the Curriculum Faculty Committee (SUSTY). They continue working toward infusing sustainability in the curriculum.

Cauldron, the faculty senate, also recently approved sustainability learning outcomes/core competencies that will appear in several undergraduate classes as part of the undergraduate curricular arc that include the following:

Skillfulness in Addressing Diversity and Ecological Sustainability

Graduates are able to think critically and analytically about social and cultural diversity; they recognize the interconnectedness of the human community to ecological sustainability and cultivate sustainable practices.

Ecological Relationships and Sustainability Awareness

Introductory Students demonstrate an understanding of principles of ecological interrelationships, including living systems, complexity and interdependence. They appreciate the need to live with awareness and respect for one's self, the earth and its inhabitants, human and nonhuman. Students understand the dynamics and significance of the ecological crisis and what is meant by different kinds of sustainability.

Intermediate Students express connections between their academic work and personal, local and global, sustainability. They understand sustainability as an expression of appreciation for the sacredness of the earth and contemplative principles in action.

Capstone Students integrate and apply a high level of understanding of different kinds of sustainability into their academic work, creative expression and community service.

Diversity and Systems of Privilege and Oppression

Introductory Students express personal beliefs and assumptions and explain systems of privilege and oppression at the local, national and global levels. They interpret the intersectionality [multi-dimensional relationships] of identifiers such as race, ethnicity, sexual orientation, gender, age, ability, and socioeconomic class and how they shape individual and collective identities.

Intermediate Students exhibit the ability to hear, connect, empathize with, and engage the different voices and stories that shape diverse human's experiences.. Students investigate the intersectionality of diversity, ecological sustainability, academic endeavor and participatory solutions within their major and intended vocation. Students raise questions about inclusiveness, privilege and oppression in their academic work.

Capstone Students extend their academic inquiry to hear, connect, empathize with and engage the diverse voices and stories that shape experience. Students incorporate an understanding of the impact of privilege and oppression in their academic work. They further evaluate their own assumptions and the assumptions of their field in light of these concerns. Students appreciate the role of diversity in their academic and creative process.

II. Co-Curricular Education

a. Internships and Service Learning

Internships, service learning, and volunteering opportunities in the fields of conservation, renewable energy production, and climate mitigation will be sought out and offered to the students of Naropa University.

b. Student Leadership Development

Because the Naropa Sustainability Council has several student seats, and is co-facilitated by the Student Sustainability Coordinator, it serves as an outlet for student leadership development. The Naropa Sustainability Council will work to enhance student leadership and engagement in the CAP planning and implementation process.

b. Campus events

Naropa has been hosting zero waste events for some time and will continue to work to reflect the university's climate goals and actively solicit participation in achieving these goals. This may be done through information booths, announcements, high-visibility opportunities for climate-conscious behaviors such as recycling and biking, and other means. The Naropa Sustainability Council will continue to host Earth Day and Campus Sustainability Day every year and work to involve as much of the campus and broader Boulder community as possible.

c. Orientation

Zero waste/recycling and other sustainability initiatives have been part of the student orientation experience in the past, but consistency has been lacking. Orientation is a great opportunity to introduce students to the climate and sustainability values of Naropa.

Recommendations:

- Incorporate climate neutrality and sustainability aspects into new student orientation and service projects.
- Work more closely with the Dean of Student's office to make sustainability initiatives a permanent part of the orientation process.

d. Dorm Competitions

An approach that has been successful at many other universities is hosting dorm competitions to reduce energy and water consumption. Naropa's Snow Lion apartments are individually metered, making them ideal candidates for such an idea.

Recommendations:

- Explore student receptivity to the concept of a dorm competition.

e. Individual Responsibility and Awareness-Raising

Naropa will strive to actively encourage individual responsibility and awareness-raising by regularly informing students, faculty, and staff of the progress made by Naropa on its journey toward climate neutrality. Educational materials will be distributed with tips on how individuals can make small but important changes which will help the university achieve its climate goals.

Recommendations:

- Host climate neutrality dialogues/presentations on campus to report on current status, progress to date, and future plans.
- Join regional and national third party networks and competitions to support existing efforts and boost name recognition e.g. EcoChallenge and RecycleMania.

f. Resource Consumption Data Feedback

It has been demonstrated that when building occupants have easy access to real time data feedback related to energy and water usage in their buildings, they often reduce energy and water use.

Recommendations:

- Explore possibility of installing real time data feedback monitors in lobbies of Administration Building and Snow Lion.
- Explore possibility of installing real time data feedback dashboard on every computer monitor to be visible when staff and faculty login to the Naropa system.

Community Outreach & Collaboration

Naropa University will continue to play a leading role in the Boulder community by setting a high standard in taking responsibility to mitigate climate change. The university will support climate neutralizing projects of other organizations and individuals and collaborate with these projects and organizations whenever possible.

Boulder is home to many progressive organizations. Naropa University will strive to continue building relationships with community members such as CU Boulder, Eco Cycle, and the Center for Resource Conservation. Naropa may explore opportunities to build relationships with its immediate neighbors that could reap many unforeseen benefits such as shared solar power developments, heating and cooling projects, waste stream utilization, etc.

Recommendations:

- Engage community organizations and neighbors such as CU, Quality Inn and Suites, Briar Rose Bed and Breakfast, and Goss-Grove Neighborhood landowners to explore climate mitigation and sustainability collaboration opportunities.

Financing

Achieving climate neutrality will depend on ample, consistent funding. Naropa recognizes that conservation, efficiency, and renewable energy projects are valuable economic, environmental, and social investments. Naropa has committed to invest up to $20,000 in the 2012-2013 fiscal year to advance Naropa's climate action and sustainability initiatives; however, additional funds will be needed in future years. Naropa University will aspire to make climate neutrality one of its priorities in the budgeting process.

I. Internal Funding

a. Reinvestment of Savings

Cost savings realized as a result of renewable energy and energy efficiency upgrades will be tracked and could then be reinvested in further efforts toward climate neutrality and environmental sustainability.

Recommendations

- Consider drafting a reinvestment of savings proposal for review by the Director of Facilities and Operations and Chief Financial Officer.
- Set up Naropa Sustainability Council/Climate Neutrality Working Group financial account within the Facilities Department.

b. Sustainability Fund

Naropa University students, alumni and the greater community represent a wonderful resource for funding conservation, efficiency, and renewable energy projects. Setting up a Sustainability Fund within the University is a key to allowing individuals to align their values with Naropa University's commitments. By actively soliciting and raising funds designated for sustainability projects, the university also may become an attractive candidate when applying for outside grants. The internal commitment and financial support of students, faculty, staff, alumni, and others is an essential element to many donors as they consider grant making.

Recommendations

- Set up and promote the establishment of a Sustainability Fund account with input from the Development and Marketing departments in order to maximize its impact.

c. Student Green Fee

The Naropa Sustainability Council will collaborate with the UN (United Naropa, the student government organization) in proposing a student green fee that would be dedicated to advancing climate neutrality and sustainability projects and programs on campus. So far, students seem to be receptive to the idea.

Recommendations:

- Draft student green fee proposal for review and approval.

d. Carbon Fee on Parking Permits

Naropa University will consider adding a Carbon Fee to all parking permits. Monies collected through these fees would be used to further fund carbon neutralizing efforts, especially those focused on transportation issues.

Recommendations:

- Develop survey to gauge student, faculty, and staff receptivity

II. External Funding

a. Power Purchase Agreements (PPAs)

A PPA is an agreement with a third party to finance, own, and operate a renewable energy system and through which Naropa would purchase energy. The renewable energy, such as solar panels would be owned and maintained by the third party, but be located on Naropa's campuses. A PPA would allow Naropa University to benefit from the energy produced without the need to make a direct capital investment... A typical PPA would obligate Naropa to purchase energy at a negotiated rate, for a fixed period of time to allow a return to the third party investor after which the ownership of the installed infrastructure would transfer to the University.

b. Energy Performance Contracting (EPC)

EPC is a financing vehicle offered by third parties along with auditing, implementation, and monitoring services whereby the cost of installing renewable and energy efficiency projects is borne by a third party. The repayment obligation is tied to the actual energy savings over a negotiated baseline, thereby ensuring a link between project cost and measurable savings. For more on EPC visit: http://www.energystar.gov/ia/partners/spp_res/Introduction_to_Performance_Contracting.pdf

c. Grants

Government, foundation, and private philanthropic grants will be explored.

d. Loans

As a non-profit with a strong credit history, the university has access to reasonably priced loan capital in cases where direct borrowing makes economic sense.

Appendices

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Appendix A

Naropa University Mission Statement

Inspired by the rich intellectual and experiential traditions of East and West, Naropa University is North America's leading institution of contemplative education.

Naropa recognizes the inherent goodness and wisdom of each human being. It educates the whole person, cultivating academic excellence and contemplative insight in order to infuse knowledge with wisdom. The university nurtures in its students a lifelong joy in learning, a critical intellect, the sense of purpose that accompanies compassionate service to the world, and the openness and equanimity that arise from authentic insight and self-understanding. Ultimately, Naropa students explore the inner resources needed to engage courageously with a complex and challenging world, to help transform that world through skill and compassion, and to attain deeper levels of happiness and meaning in their lives.

Drawing on the vital insights of the world's wisdom traditions, the university is simultaneously Buddhist-inspired, ecumenical and nonsectarian. Naropa values ethnic and cultural differences for their essential role in education. It embraces the richness of human diversity with the aim of fostering a more just and equitable society and an expanded awareness of our common humanity.

A Naropa education—reflecting the interplay of discipline and delight—prepares its graduates both to meet the world as it is and to change it for the better.

Appendix B

Mitigation Strategies

Naropa University has a wide array of mitigation strategies available. All of these strategies will be explored in addition to new strategies as they arise.

1. **Policies**
   Policies are one kind of mitigation strategy. By developing and adopting certain policies, Naropa can move toward greater institutionalization of climate action on a campus-wide scale both in tangible emissions reductions and shifts in culture. Below are several critical policy recommendations that will aid in achieving climate neutrality at Naropa.

   a. **Sustainability Statement**
      Naropa's Board of Trustees, upon recommendation by the President and the Naropa Sustainability Committee has adopted an overarching Sustainability Statement that will help develop a culture and ethic of climate stewardship and sustainability and bring Naropa into alignment with its own mission.

   b. **Climate Friendly Investments**
      Naropa University will consider the climate treatment record of the entities in which it invests. Those with a record of positive climate action and carbon mitigation will be given preference over those with demonstrated poor emissions and environmental practices.

   c. **Environmentally Preferable Purchasing (EPP)**
      There is increasingly an understanding that commodities, and especially foods, produced by most commercial industries are having a huge negative impact on the environment. Naropa is building greater awareness of these upstream environmental costs and will work to mitigate them through EPP. In developing an EPP policy attention will be paid to the waste produced and embodied by products as well as the carbon emissions related to the production, transportation, and packaging of the products Naropa University purchases. An EPP policy will help contribute to our zero waste goals and hence our emissions reductions. Whenever possible, local, compostable, and/or minimally-packaged products and food will be purchased by the university. Producers and vendors who have demonstrated carbon awareness and positive action toward climate neutrality will be favored over producers and vendors who have not demonstrated awareness or reduction in their carbon-emitting practices.

      Naropa is already dedicated to purchasing energy efficient appliances that are ENERGY STAR rated. Additional consideration will be given to other standards and certifications such as EPEAT (for computers and other electronics), wind powered (for paper), and Green Seal (for cleaning products) certifications. Clear, concise guidelines for lighting fixtures, small appliances, office products, and computers to purchase may be made. Any such guidelines and recommendations will be distributed to all Naropa University students, faculty, and staff. Enforcement of these guidelines is particularly important in the student residence halls.

Recommendations:

- Draft formal policy for review and adoption.

d. Reduce, Reuse, Recycle

Naropa currently has an informal "Reduce, Reuse, Recycle" policy to achieve a zero waste campus.

Recommendations:

- Draft formal policy for review and adoption.
- Enter RecycleMania Competition each year.
- Enter EcoChallenge each year.

e. Green Building

Buildings are the largest source of energy consumption on campus. How buildings are constructed has a dramatic effect on Naropa's carbon footprint. Naropa may consolidate and will enlarge its campuses in the future. The most important proactive move Naropa can make in this process to ensure that it is not locked into continued inefficiencies and wasted emissions for many years following new construction (and major renovation projects) is to commit to building all new buildings to a high efficiency standard. Today such a standard is represented by a LEED designation (Leadership in Energy and Environmental Design). In this fast moving field of environmental impact measurement other standards are being developed which may be sensible to adopt. The goal is to invest capital so that environmental impact may be minimized, not to obtain a certificate for the wall. The detailed LEED checklist and recommendations will be utilized as the benchmark for Naropa.

Recommendations:

- Naropa commits to build to a minimum of LEED Silver standard for all new construction and major renovation projects and will aspire to invest in the additional areas of construction and site development which meet the higher LEED levels such as Gold and Platinum.
- Draft Green Building Policy for review and adoption

2. Energy Efficiency and Conservation

Improving energy efficiency is a top priority for Naropa University because it allows the campuses to continue to provide the reasonable heating, cooling, lighting and general functionality which provides a comfortable learning and work environment. That can be accomplished while consuming less carbon-intensive energy, thereby producing fewer greenhouse gasses. Through the leadership of the Director of Facilities and Operations, Aaron Cook, Don Rasmussen(former Director of Facilities), and Sandy Goldman (former Vice President of Operations) Naropa University has already made a number of improvements and moved toward more energy efficient campuses. The university is proud that these types of improvements are a natural part of the culture and decision-making process in the Facilities Department. The department is keenly aware of the types of improvements needed to reduce energy consumption. Gradual, but systematic upgrades to mechanical systems, lighting, and appliances will lead to reductions in greenhouse gas emissions and will also reduce operating costs.

As action is taken to strengthen Naropa University's environmentally friendly practices, all parties can strive for increased awareness and make a commitment to use resources responsibly and conservatively. By simply using "only what you need," reliance on carbon-intensive energy can be reduced drastically.

a. Air Sealing and Insulation

Sealing and insulating the building envelope of every Naropa University building will be the most cost-effective way to improve energy efficiency and comfort. ENERGY STAR estimates that a skilled contractor can create annual savings of up to 20% on heating and cooling costs (or up to 10% of the total energy bill) by simply sealing and insulating the shell of the building and thereby creating an effective thermal break between the interior and exterior of the building. Over time, the cost of sealing and insulating a building envelope offers a significant return on investment.

Recommendations:

- **Air Sealing and Insulation at Snow Lion**
  Bestway Insulation provided Naropa University with a bid proposal to provide air sealing and insulation for the 1900 Goss Street apartment building. The findings indicate a number of areas where efficiency can be improved and savings can be increased. The findings and indications are outlined in Appendix D. Information is still needed to implement this project. See Planning and Implementation Phasing, Phase II, c., 1.
- **Energy Audits**
  To get a complete and accurate picture of the potential for energy reduction and related cost savings, Naropa University will hire a credible contractor to perform a blower door and infrared test on every building located on the school's campuses. This type of energy audit will provide the necessary data for identifying modifications to the building envelope which would enhance energy efficiency. Such modifications might include increased insulation, window upgrades, weather stripping or other sealing of doorways and windows, and roofing improvements. See Planning and Implementation Phasing, Phase II, d.

b. Appliances and Computers

Approximately 61% of Naropa University's current Scope 1 emissions are a result of electricity use, indicating that numerous opportunities exist for improving energy efficiency. Most appliances and computers still consume electricity even when they are not actively being used. Computers especially are increasingly driving up electricity consumption on college campuses. It has been estimated that about 50% of the energy drawn from electrical outlets is wasted power that is expended as heat and may result in increased air conditioning costs.

Recommendations:

- Educate students on how to use a power management feature on computers and appliances.
- Encourage staff and faculty to use power management features on university-owned computers so that the appliance automatically turns off or "goes to sleep" when it has been left idle for a specified amount of time.
- Encourage faculty and staff to shut down computers at the end of the work day and when not in use for an extended period of time. Unplugging or turning off power strips will also be encouraged.
- Investigate network-based software programs that can monitor and control the energy usage of all networked computers. These programs typically have a low cost and quickly recoup the initial investment. Implementing this type of network software may qualify Naropa University for a utility company rebate through a Custom Efficiency Program.
- Create an inventory and upgrade plan of every appliance on the university's campuses to provide data that can support the purchase of new, more energy efficient models. An upgrade

plan will also be developed to ensure that old appliances are replaced before they cease functioning properly. All appliance replacements will be ENERGY STAR certified. ENERGY STAR products yield an average energy savings of 12%. Naropa University has adopted a policy of purchasing ENERGY STAR appliances whenever available and with proper comparative research. The university will upgrade all non-ENERGY STAR appliances to ENERGY STAR models as applicable.

- Students, faculty, and staff will be provided with an annual report outlining the energy consumption, cost, and greenhouse gas emissions from all Naropa University relevant initiatives. This will allow the Director of Facilities and Operations to keep everyone informed so adjustments to energy usage can be made accordingly. (Also see Education and Research section II, c.)
- Install vending misers on vending machines. See Planning and Implementation Phasing, Phase II, c. 3. for next steps. These machines are typically operational 24 hours each day, regardless of the presence of people. Vending misers operate like occupancy sensors (see programmable lighting section below) and automatically reduce electricity consumption of the machine when the nearby space is unoccupied. Energy savings are seen from turning off lights and reducing usage of the compressor. Vending misers cycle the compressor on periodically, even in the absence of people, to ensure that beverages or other items remain cool.
  http://www.vendingmiserstore.com

c. Lighting

Naropa University will further reduce unnecessary electricity usage and thereby reduce greenhouse gas emissions by installing programmable lights and devices which automatically turn on lights when occupancy is detected, and automatically turn the lights off after a pre-programmed period of inactivity. When necessary, these devices should have a means of being overridden in the event that lights need to be turned off when the room is occupied. Naropa already uses motion sensors on many lighting circuits, particularly in restrooms, but will explore additional applications.

i. Programmable Lighting

A variety of programmable lighting options exist. Some options are preferable in some applications, while other options are ideal in different situations. Widely used technologies includes Ultrasonic Motion Sensors that detect movement using sound waves, Infrared Motion Sensors that detect emitted heat sources, Dual Technology Sensors that use both infrared and ultrasonic technology, Timers that automatically turn off lights after a pre-programmed period of time or inactivity, and Photocells that dim, step up or down, and turn on or off a set of light fixtures as the amount of sunlight in a space decreases or increases.

Recommendations:

- Conduct Inventory of programmable lighting installations on campus
- Request bids from outside contractors to conduct lighting audit focusing on photocell applications

ii. Lighting Types

Naropa University has already upgraded most of its lighting to use compact florescent light (CFL) bulbs. CFLs use 25% of the energy to produce the same light and last up to 15 times as long as traditional incandescent bulbs. Light Emitting Diode (LED) lights are becoming more

reliable and cost-effective for many applications. LED lighting reduces electricity use by up to 95% and last up to 40 times as long as conventional exit signs. Premium Efficiency Electronic Ballasts will be used to retrofit all fixtures using 28-watt T8 lamps. T8 technology has many benefits including: increasing light output by 11%, improving color rendering by 21%, improving color temperature for warmer feel, and eliminating ballast hum and flicker, all while reducing energy use by up to 30%.

Recommendations:

- Conduct inventory of lighting upgrades
- Upgrade all incandescent lighting to CFL or LED, but prioritize use of LED over CFL whenever possible
- Upgrade all EXIT signs and appropriate outdoor lighting to LED
- Upgrade all ballasts to T8
- Make necessary calculations and enter into project matrix

iii. De-Lamping

Lighting can be excessive. De-lamping involves removing lighting fixtures to meet baseline luminance levels recommendations by the Illuminating Engineering Society of North America (IESNA).

Recommendations:

- Rent or purchase photo sensor to measure light levels
- Remove lighting where it is excessive
- Make necessary calculations and enter into project matrix

iv. Skylights/Solar Tubes

Making changes in building architecture, such as the installation of skylights or solar tubes, in concert with photocell integration, can aid in lighting use reductions.

Recommendations:

- Request bids from outside contractors to conduct solar tube installation feasibility study for all campus buildings.

d. Temperature and Climate Control

A significant amount of energy is used at Naropa University to heat buildings in the wintertime and cool them in the summertime.

i. Thermostats

The temperature set points programmed into a building thermostat's schedule have a significant effect on how much energy is used for heating or cooling. Temperature set points reduce the energy loss through the building envelope during unoccupied hours. For example, in the case of a residential building, temperature setbacks can be effectively used during the night even in the wintertime when cooler temperatures may be preferable for sleeping. The simple action of adjusting the temperature set point a degree or two lower in the evenings during the winter results in measurable energy savings. Occupied temperature set points of 68° F in the wintertime and 75°F in the summertime are recommended. Typical unoccupied set points are 60° F in the wintertime and 85° F in the summertime. These temperatures are intended to balance comfort and energy conservation and should be comfortable for most people dressed

appropriately for the season. (American Society of Heating, Refrigerating, and Air-Conditioning Engineers – ASHARE Standard 55 – Thermal Environmental Conditions for Human Occupancy)
Recommendations:

- Install programmable thermostats in all buildings and rooms.
- Set programmable thermostats with appropriate set points so that indoor temperatures approach outside temperatures during hours the rooms are unoccupied.
- Create information card/directions with step-by-step instructions for the proper operation and effective use of programmable thermostats will be posted near each thermostat installed.
- Limit access to programmable thermostats to ensure the agreed upon temperature ranges may be met.
- Install programmable thermostats in each apartment unit in the 1900 Goss Street apartment building. See above section Planning and Implementation Phasing, Phase II, c., 4.

ii. Boilers and HVAC Systems

Making sure HVAC systems are operating properly will help reduce energy consumption and related costs. Naropa University and its staff will make proper maintenance of the HVAC system a priority to ensure efficient function.
Recommendations

- Employ Good Practices
    1. Use air handling unit economizing controls. Economizers mix indoor and outdoor air so the least amount of energy is needed to heat and cool the building. Naropa University's mechanical contractor will check the HVAC economizer settings to make sure they are set and function properly.
    2. Use discharge air temperature reset controls. By increasing the discharge air temperature setting on cold days, reduction is achieved in both the amount of cooling energy used and the amount of electric reheat necessary.
    3. Reduce static pressure set point. Reducing the variable frequency drive (VFD) fan pressure set point in main air handlers will reduce both the amount of fan motor energy used and the amount of cooling and reheat energy necessary. To ensure that all zones' conditioning needs are still being met, the zone with the largest pressure drop in the duct system will be checked.
    4. Use lockout function. This function on cooling equipment compressors will be monitored in the winter to ensure lockouts are functioning at the appropriate temperatures. This prevents the high energy consumption of a system which rapidly recycles on and off.
    5. Clean condenser coil fins will be maintained in order to ensure more efficient heat transfer and thus more efficient operation of the unit.
    6. Filters will be kept clean and replaced as necessary in all air conditioning units. This ensures the units are expending the least amount of energy possible to supply air to the system.

- Explore Retrofitting Photography Studio Exhaust System
  Naropa University requested that Excel Energy perform and energy assessment to identify opportunities for potential improvement and investment options for the facility at 6287 Arapahoe Road. The findings indicate several possible measures for improving efficiency on the HVAC system serving the photography studio. The findings and potential energy-reducing measures are outlined in Appendix E.
- Upgrade Boiler to Include Reset Schedule
  Naropa University requested that Xcel Energy perform and energy assessment to identity opportunities for potential improvement and investment options for the building at 1900 Goss Street (Snow Lion). The findings and potential energy-saving measures are indicated in Appendix F.
- Replace HVAC Unit at Paramita upon Failure of Existing Units
  Naropa University requested that Xcel Energy perform and energy assessment to identity opportunities for potential improvement and investment options for the facility at 3285 30th Street. The findings and potential energy-saving measures are outlined in Appendix G.
- Employ Good Practices in Administration Building
  Naropa University requested that Xcel Energy perform and energy assessment to identity opportunities for potential improvement and investment options for the administration facility at 2130 Arapahoe Street. The findings indicate that this HVAC system would benefit from the good practices outlined above and that such practices would result in significant energy and cost savings.

iii. Space Heaters

Though electric space heaters are small, they can have a big impact on electricity consumption and costs. According to Xcel Energy, most units draw as much as 1500 watts of electricity when operating, and having just one of these units on at full power is equivalent to operating fifteen 100-watt incandescent light bulbs. Xcel Energy estimated that 95% of the natural gas used in one university facility is used for space heating, and only 5% is used for cooking. Radiant heaters consume about one-tenth of the power a standard space heater consumes, and they are available as rubber floor mats, carpeted floor mats, under-desk panels, or overhead panels. These energy efficient heaters also operate at lower, safer temperatures and present no tripping hazard. While it is most preferable to avoid the need for any space heaters through well balanced central HVAC systems, Naropa has some older buildings not able to provide consistently comfortable conditions and a functional work environment is an important priority.

<u>Recommendations:</u>

- Discourage use of electric space heaters among students, faculty, and staff.
- Replace electric space heaters with radiant heaters for a more comfortable, energy efficient solution.
- Provide staff and faculty with information on who to contact with issues.

iv. Geothermal Heating & Cooling

Life-cycle analyses consistently show that geothermal heat pumps (or geo-exchange units) costs are lower than those of conventional HVAC equipment. Geothermal heat pumps reduce peak power usage during the summer months, thus reducing costs. Of all the alternative energy sources available to Naropa University at this time, geothermal is the most complete and comprehensive technology to reduce greenhouse gas emissions. Blue Valley Energy, a local company, was asked to provide an overview of the possibilities of implementing geothermal heating and cooling on the Naropa University Campuses. See Appendix C.

Recommendations:

- Install geothermal heat pump for Administration Building:

Project Cost ($)	Annual Savings ($)	Simple Payback (years)	Annual Emissions Reductions (MTCO2e)
350,000	24,000	14.5	183.7

- Request bids from outside contractors to conduct geothermal heat pump feasibility for other campus locations.

v. Roof Color

Technology is currently being developed which will allow the roof color to be white in the summer to prevent the building from absorbing heat from the sun and thereby warming the building and requiring cooling energy. Similarly, the roofs will be able to convert to a dark or black color in the winter so the sun's heat is absorbed and used to help heat the building which will lessen the amount of heating energy needed from carbon-intensive sources. Naropa University will keep informed of the status of this developing technology and integrate it when and if appropriate. Upgrading roofing material to a light or white colored material will be considered until this technology is available.

Recommendations

- Research novel roof color technologies and identify potential buildings to which they can be applied.

e. Rebate Programs

Under the guidance of the Director of Facilities and Operations, staff at Naropa University will keep informed of all rebate programs available through Xcel Energy Company. These rebate programs are designed to reduce the capital cost required to install high-efficiency equipment, reduce the time required to recoup costs, and make energy efficiency an economically more attractive, affordable proposition. Changes in market forces cause rebate programs to constantly shift their requirements and incentive levels. Being informed of current program offerings will allow Naropa University to make budgeting and purchasing decisions in an educated manner.

Information is at http://www.xcelenergy.com/SiteCollectionDoccuments/docs/ConservationProgramsSummariesCO.pdf

Applications are at http://www.xcelenergy.com/Business/Programs_Resources

3. Transportation

Emissions associated with transportation involve commuting to campus, on campus transportation from Naropa's fleet of vehicles, and air travel by faculty and staff for university related business.

Naropa has made great strides to reduce emissions associated with commuting. Every student, faculty, and staff has an Eco Pass that allows them to unlimited travel of the local and regional RTD bus system. Naropa also has a free bike program: the Bike Shack. The Bike Shack maintains 120 bicycles available for all students, faculty, staff, alumni and visitors. Bicycles can be checked out for up to a month at a time and are maintained by Naropa's bike shack mechanics. Naropa is also home to one of eGO Carshare's (carshare.org) vehicles making it easy for Naropa students, faculty, and staff to rent a car at an easy pick up location as needed.

45% of students and 66% of faculty and staff drive to campus, adding up to 750,000 miles traveled each year commuting to and from campus. The university will continue to provide and encourage alternatives to these commuter miles in order to reduce the amount of associated carbon emissions. The Director of Facilities and Operations will work to continuously research and implement alternative transportation options and opportunities in collaboration with the Transportation Coordinator.

a. Commuting

The university will continue to provide Eco Passes and promote the Bike Shack.

Recommendations:

- Designate parking spots for carpoolers.
- Seek to provide additional student housing close to the campuses.
- Explore the development of incentives for choosing to live close to the campuses.
- Expand and enforce proper covered bike storage on campuses.
- Encourage GO Boulder activities and initiatives.
- Encourage individuals to take full responsibility for their commuting choices and provide opportunities for individuals to reflect and act on the values created in such a climate.
- Offset commuting emissions with verified emissions reductions.
- Explore the creation of events such as a bike to work day, week, or month.
- Set up carpooling program on website (especially for night classes).
- Explore good placement opportunities for electric vehicle charging stations. Estimate: $3,000 per station.

b. University Fleet of Vehicles

The fleet of vehicles which the university owns and operates will strive to reduce the number of miles travelled and to maintain the existing vehicles in good, efficient working condition. As vehicles need to be replaced, clean, energy efficient vehicles will be purchased and a transition to a less carbon-intensive fleet will be made.

Recommendations:

- Explore ways to reduce fuel use.
- Research feasibility and timeline for replacing fleet with electric vehicles (EVs).
- Explore purchasing Colorado Carbon Fund license plates to offset 100% of every fleet vehicle's emissions. http://coloradocarbonfund.org/index.php/partners/license-plate
- Explore the possibility of using biodiesel and other less polluting fuels.
- Allow for renting of university vehicles to faculty and students to reduce individual car use.
- Promote use of Carshare found on both Arapahoe and Paramita campuses

c. Air Travel

Faculty and staff air travel related to university business contributes to Naropa's carbon footprint.

Recommendations:

- Explore strategies to encourage teleconferencing
- Offset air travel emissions with carbon offsets or verified emissions reductions

4. Solid Waste

Naropa will formalize a "Reduce, Reuse, Recycle" policy and continue to strive for zero waste. Naropa diverts approximately 75% of waste from the landfill through recycling and composting. The remaining 25% will probably be the most difficult to divert. Although the remaining 25% of waste only accounts for 0.3% of Naropa's total emissions, it is estimated that the material society consumes daily may represent over 42% of overall emissions. It is critical that humans work toward reducing the climate impact of all the materials we consume. Naropa University will continue to encourage individuals to reduce their use of material goods, to reuse whatever they can, and to recycle everything else.

Recommendations

- Consolidate/streamline waste, recycling, and composting services.
- Conduct waste audit to discover how much of what is being land filled could be recycled or composted.
- Develop Zero Waste event guidelines.
- Hire work study to coordinate recycling efforts and Zero Waste events.

5. Onsite Renewable Energy Production

It is important for Naropa to develop on-site renewable energy to achieve carbon neutrality. Naropa University will engage with local renewable energy companies now to begin mapping out all the opportunities that will present themselves in the future. Besides reducing greenhouse gas emissions from the use of coal, natural gas, and gasoline, investing in renewable energy production will hedge against increasing energy prices as well. As part of Naropa University's goal to design and build a future campus, it is critical that resources be spent on integrating both energy efficient measures and comprehensive renewable energy sources.

a. Photovoltaic

In 2008, Namasté Solar donated a 1.3kW solar photovoltaic array for Naropa's print shop roof. Naropa will seek to expand solar capacity to meet electricity demand after thorough conservation and efficiency measures have been undertaken.

Namasté Solar was asked to provide an overview of the possibilities of implementing solar on Naropa's campuses. An overview is as follows:

2130 Arapahoe Road:

- Possibly 10-20kW on one or two of the buildings
- Approximate pre-rebate cost: $65,000 - $130,000
- Approximate annual power production: 14,400kWh's – 28,800kWh's

6287 Arapahoe Road:

- 70 – 100kW
- May attract a PPA (see Financing section II. a.) if we can get to 100kW

- Approximate pre-rebate cost range: $380,000 - $550,000
- Approximate annual power production: 92,000kWh's – 130,000kWh's

3285 30th Street

- 50 – 70kW
- Approximate pre-rebate cost range: $280,000 - $380,000
- Approximate annual power production: 65,000kWh's – 92,000kWh's

1900 Goss (Residence Hall)

- Possibly 10-20kW on one or two of the buildings
- Approximate pre-rebate cost: $65,000 - $130,000
- Approximate annual power production: 14,400kWh's – 28,800kWh's

David Henry – Namasté Solar

When considering an investment of this magnitude, it is important to find the right technology to provide an economically justifiable investment. Naropa will reduce energy consumption overall first so that the total amount of solar capacity needed is reduced. Naropa may also explore financing solar projects with community neighbors that may be interested in solar power.

Recommendations:

- Focus on reducing energy use first.
- Explore realistic funding options, including grants, PPAs or EPC (see Financing) and neighborhood/community partnerships.

b. Solar Thermal

Solar thermal technologies provide hot water without producing emissions. They also have a much quicker payback than photovoltaic technologies.

Recommendations:

- Request bids from outside contractors to conduct solar thermal feasibility studies for all Naropa's campuses.

c. Wind Power

Unfortunately, installation of large wind turbines is not possible. City of Boulder codes indicate that "the maximum height for all accessory building structures and uses are 25' in industrial areas." However, architecture/small scale wind applications will be monitored and explored.

Recommendations:

- Explore practicality of installing wind measurement devices to understand potential small scale wind applications on Naropa's campuses.

6. Renewable Energy Purchasing

One of the biggest obstacles to achieving climate neutrality is purchased energy, primarily electricity for Naropa. Electricity purchased from the grid is carbon intensive and outside of Naropa's direct control. Purchasing renewable energy only becomes possible when it is provided by the local utility, Xcel Energy. The City of Boulder recently voted to municipalize the utility; however, the city owned and operated utility will not be online for some time. Until then, Naropa must work with what Xcel has to offer. Fortunately, Xcel currently provides 15.4% renewable energy to its power generation mix in Colorado, which is a good start.

7. Renewable Energy Certificates

Naropa has been purchasing renewable energy certificates (RECs), also known as renewable energy credits or greentags, since 2008. RECs are market commodities that represent the environmental benefits of producing renewable energy. In September of 2012 Naropa was awarded a certificate from the Environmental Protection Agency (EPA) acknowledging the university's commitment and participation as a Green Power Partner. The EPA's Green Power Partnership is a voluntary program that encourages organizations to buy green power or carbon credits as a way to reduce the environmental impacts associated with electricity use. The Partnership currently has more than 1,300 Partner organizations voluntarily purchasing billions of kilowatt-hours of green power annually.

8. Carbon Offsets

Closely related to RECs are carbon offsets or verified emissions reductions. As opposed to RECs which don't necessarily mean a net reduction in grid load or the emissions associated therein, carbon offsets represent actual reductions in emissions somewhere else that are registered and sold in the market. Given the current state of technology and societal progress it is nearly impossible to independently achieve climate neutrality without purchasing carbon offsets. There are a number of credible and independently certified carbon offset programs, including the Colorado Carbon Fund. This organization stands above many because its mission is to reduce emissions by supporting new, clean energy projects right here in Colorado. However, carbon offsets will be considered a "last resort" means of mitigating greenhouse gas emissions. Usually, a carbon offset comes from a program or activity that is designed to remove carbon dioxide from the atmosphere and sequester it. Another option is to support renewable energy projects that will replace the production of carbon-intensive energy with clean, renewable energy.

a. Consider Offsetting instead of RECs

b. Maintaining and Expanding Tree Planting

It is estimated that a single healthy tree can store approximately 13 pounds of carbon or 2.6 tons per acre each year. An inventory of all trees living on each campus will be made and a professional will evaluate the health of each one. Besides maintaining the current tree inventory, additional native tree species will be planted.

Neither RECs nor carbon offsets are longer term solutions for Naropa or any institution, but they do help drive and support renewable energy markets and emissions mitigation strategies.

Appendix C

Geothermal Overview

"The first building is the Administration Building. The current system utilizes a Trane system that has a large rooftop unit that brings the building up to near a comfort level after night set back and utilizes numerous air control units throughout the building. Each of the air control units has an electric heater that provides the heating to each of the areas it services. All air control devices would be replaced with an individual earth coupled heat pump. The electrical already in place to power the electric heat would be redirected to power the geoexchange unit. The system would be compatible with a DDC (computer interface direct digital control system) the total heating and cooling CO2 per year is 539,985 lbs. The geoexchange retrofit would save 75% in operating costs and reduce the CO2 production for this building from the current 539,985 lbs. per year to 134,996 lbs. per year. The cost of this retrofit would be approximately $330,000 to $350,000. In addition to cutting CO2 production dramatically, the system operation cost would decrease from $32,500 per year to under $8,500 per year. The substantial energy cost savings would pay back the cost of the system in ten to fifteen years. The ten-year reduction in CO2 production would be over 4,000,000 lbs. and would represent more than $250,000 in cost savings. This building would become a top priority for maximum effect." Further, "Geothermal fits very well into the future master plan for the Naropa University and the very important goal of reducing greenhouse gas emissions. Heating and cooling of buildings is the largest single energy use for buildings and geothermal heating and cooling systems are the only established technology that can produce a dramatic reduction in the energy used and CO2 emissions. The technology is widely deployed, flexible and is more easily maintained than other commercial heating and cooling technologies."

Monte D. Schmidt
Blue Energy Valley Energy
http://bluevalleyenergy.com

Appendix D

Blower Door and Infrared Test Findings for Apartment #315 1900 Goss Street Apartment Building

1. Large amount of air leakage occurs through the recessed lights in all the northern units of the apartment complex on each level tested. Air leakage also occurs near the recessed lights in the east end upstairs units. An air bypass occurs in the ceilings where these recessed lights are located.

2. Interior walls between units have a high air leakage rate.

3. Floors over unconditioned space leak a high level of air. The floor under the second level of the upstairs units leaks air into the 1st level of the east wing upstairs units' recessed lights. Air does not leak into the North wing, suggesting a separate source for this air leakage. Additional inspection within the attic is recommended if access to attic is available.

4. Cathedral Ceilings and Walls leak a large amount of air and could use extra insulation / air barrier.

5. Air leaks around lights, attic fans and outlet plate covers can be air sealed with gaskets to reduce airflow.

6. Boiler is radiating heat into units.

7. Possible source of air leakage at boiler water pipe and wall connection leading to recessed lights. Other possible sources of air leakage are from upstairs attic or rim joist/outside of interior wall connection to the outside.

Appendix E

Efficiency Measures for Photography Studio HVAC 6287 Arapahoe Road Facility

During the walkthrough at 6287 Arapahoe, it was noted that the exhaust system in the photography studio was operating even though the walkthrough took place after the semester had ended. This would suggest that the system might be operating continuously throughout the year. Exhaust systems such as this evacuate air from a space and at the same time a corresponding make-up air unit or standard rooftop unit continuously conditions outside air to replace the evacuated air. This type of system, even if relatively small, consumes significant amounts of energy. There are techniques to reduce this consumption. These are outlined below.

One technique involves retrofitting the existing constant flow exhaust system with a demand-controlled ventilation system. A demand-controlled ventilation system varies the speed of the hood fans depending on the ventilation needs at any given moment. The system determines demand through sensors which detect high levels of the associated contaminate. A demand-controlled ventilation system also modulates the incoming air provided by the make-up air unit. Energy savings are realized due to reduced operation of exhaust and supply fans, as well as reduced heating and cooling needs. It is recommended that further investigation be conducted into the feasibility of retrofitting the existing exhaust system with a demand-controlled system for the particular case of a photography studio.

Another technique for improving the efficiency of this type of system is to implement some type of energy recovery measure. The air continually being exhausted from the space is at the required indoor air temperature, but cannot be returned through the HVAC system due to contaminants. At the same time, outside air enters the system and is conditioned to meet the required indoor temperature. Implementing an energy recovery measure involves retrieving some of the heat from the exhaust air to preheat the outside air in the winter, or using the exhaust air to pre-cool the outside air in the summer. This reduces the amount of heating or cooling required of the system, and therefore reduces energy expenditure. It is recommended that Naropa University's mechanical contractor investigate the feasibility of integrating some type of energy recovery for the photography studio HVAC system. Possible technologies include run-around loops, heat wheels, and heat pipes.

Appendix F

Boiler Reset and Replacement at 1900 Goss Street Building

During the walk-through, it was noted that the facility's boiler was set to lockout at 60°F, but no reset controls were in place. A boiler reset allows the boiler set point temperature to be lowered during the spring and fall when the demand for heating is limited. Implementing such controls will allow the boiler to operate at its hottest temperature when the outside air is below 20°F. From 20°F up to the lockout temperature of 60°F, the boiler's temperature would be adjusted lower in order to operate at its lowest temperature when the outside air is in the range of 50°F to 60°F. Implementing this type of reset schedule could save approximately 786 therms of natural gas annually, or $992. *It is recommended that the boiler be upgraded to include a reset schedule appropriate to the facility. Xcel Energy provides an incentive of 25% off the cost of reset control equipment, up to $250.*

The water boiler at 1900 Goss St was installed around 2002 and is roughly 81.5% efficient. Newer condensing boilers operate with efficiencies of 92% or higher; and some models operate with nearly 98% thermal efficiency. These models provide significant energy and cost savings when installed. Savings realized by installing high efficiency units in place of the existing equipment could be significant, especially for a large residential building like the one at 1900 Goss Street. Replacement of the existing unit is not likely to take place in the near future due to the age of the equipment. *However, it is recommended that upon equipment failure or when maintenance costs become high, consideration should be given to replacing the existing units with high efficiency models. Xcel Energy provides rebates for replacing standard efficiency boilers with high efficiency models.* Estimate: *$50,000*

Appendix G

Rooftop HVAC Systems at 3285 30th Street Facility

The large Mammoth brand rooftop unit (RTU) at 3285 30th Street has had its heating components decommissioned. To supply heat to the building, two smaller Reznor RTUs were added approximately 5 years ago. While the Reznor units have considerable life remaining, the Mammoth unit may be nearing the point where maintenance costs will become too high to justify its continued operation. *It is recommended that consideration be given to replacing the existing equipment with high efficiency models upon failure of the existing units. Rooftop units with cooling capability are eligible for rebates from Xcel Energy under the Cooling Efficiency Program.*

Glossary

Carbon Footprint The total set of greenhouse gas emissions caused by an individual or organization, event or product. It should be expressed in carbon dioxide equivalent (CO2e).

http://www.carbontrust.co.uk/solutions/CarbonFootprinting/carbon_footprinting_glossary.htm

Boulder Carshare Carshare provides and promotes alternatives to individual car ownership, thereby reducing the environmental and social impacts associated with motor vehicle use. Registered users are able to use a car only when they need one.

www.carshare.org

Carbon Neutral Commonly accepted terminology for something having net zero emissions (for example, an organization or product). As the organization or product will typically have caused some greenhouse gas emissions, it is usually necessary to use carbon offsets to achieve neutrality. Carbon offsets are emissions reductions that have been made elsewhere and which are then sold to the entity that seeks to reduce its impact. In order to become carbon neutral it is important to have a very accurate calculation of the amount of emissions which need to be offset – requiring calculation of a carbon footprint.

http://www.carbontrust.co.uk/solutions/CarbonFootprinting/carbon_footprinting_glossary.htm

Carbon Offset A carbon offset is a financial instrument aimed at a reduction in greenhouse gas emissions. Carbon offsets are measured in metric tons of carbon-dioxide-equivalent (CO_2e) and may represent six primary categories of greenhouse gases. [1] One carbon offset represents the reduction of one metric ton of carbon dioxide or its equivalent in other greenhouse gases.

http://en.wikipedia.org/wiki/Carbon_offset

Carbon Trust

The Carbon Trust is a not for dividend company limited by guarantee created by the UK government to help businesses and public organizations to reduce their emissions of carbon dioxide into the atmosphere, through improved energy efficiency and developing commercial low carbon technology. Its stated mission is to accelerate the move to a low carbon economy.
The Carbon Trust's core activity consists of helping companies and organizations reduce carbon emissions through providing help, support and advice. The Trust estimates in its annual report 2008 that it saves UK business £1 million a day through the cost savings reducing carbon emissions brings.

www.carbontrust.co.uk

Center for ReSource Conservation

The Center for ReSource Conservation, formerly the Boulder Energy Conservation Center (BECC), was founded in 1976 by a group of community-minded citizens seeking ways to help reduce our dependence on non-renewable resources. The organization has since developed extensive expertise in the areas of green building, renewable energy, energy efficiency, waste reduction, and water conservation.

http://www.conservationcenter.org/index.htm

Cogeneration

Cogeneration (also combined heat and power, CHP) is the use of a heat engine or a power station to simultaneously generate both electricity and useful heat. It is one of the most common forms of energy recycling.

http://en.wikipedia.org/wiki/Cogeneration

Colorado Carbon Fund

The Colorado Carbon Fund, a voluntary carbon offset program, was developed by the Governor's Energy Office (GEO) to advance the following objectives:

- Develop a funding source for community-based clean energy and climate mitigation projects in Colorado
- Support Colorado's climate change mitigation objectives
- Provide high quality, credible offsets for individuals, businesses and government agencies interested in mitigating their carbon footprint

http://www.coloradocarbonfund.org/index.php/why-project-c/

Compact Florescent Light Bulb

CFLs produce light differently than incandescent bulbs. In an incandescent, electric current runs through a wire filament and heats the filament until it starts to glow. In a CFL, an electric current is driven through a tube containing argon and a small amount of mercury vapor. This generates invisible ultraviolet light that excites a fluorescent coating (called phosphor) on the inside of the tube, which then emits visible light. CFLs need a little more energy when they are first turned on, but once the electricity starts moving, use about 75 percent less energy than incandescent bulbs. A CFL's ballast helps "kick start" the CFL and then regulates the current once the electricity starts flowing.

http://www.energystar.gov/index.cfm?c=cfls.pr_cfls_about

EcoCycle

Working to build zero waste communities, EcoCycle provides recycling guides and tips, locations, newsletter and other features, volunteer opportunities and composting information.

http://www.ecocycle.org/

EcoPass

Eco Pass is an annual transit pass purchased by a company or its employees, that provides unlimited usage of RTD services. Companies purchase the Eco Pass for all full-time employees, with an option to include part-time employees. Eco Pass is also tax deductible to employers and tax free to employees (up to $230/month or $2,760 annually).

http://www.bouldercounty.org/ecopass

Energy Recovery

Energy recovery includes any technique or method of minimizing the input of energy to an overall system by the exchange of energy from one sub-system of the overall system with another. The energy can be in any form in either subsystem, but most energy recovery systems exchange thermal energy in either sensible or latent form.

http://en.wikipedia.org/wiki/Energy_recovery

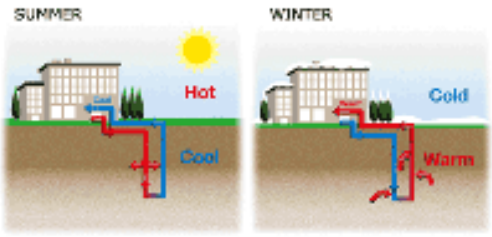
ENERGY STAR

Products carrying the ENERGY STAR seal – from appliances and building materials in the home, to office machines and other commercial products in business environments – contribute to energy conservation and cost savings. ENERGY STAR is a joint program created by the U.S. Environmental Protection Agency and the U.S. Department of Energy.

http://www.energystar.gov/

Geothermal Heating and Cooling

This marvelous technology relies primarily on the Earth's natural thermal energy, a renewable resource, to heat or cool a house or multi-family dwelling. The only additional energy GeoExchange systems require is the small amount of electricity they employ to concentrate what Mother Nature provides and then to circulate high-quality heating and cooling throughout the home.



http://www.geoexchange.org/

GO Boulder

The network of alternative transportation in the City of Boulder and Boulder County.

http://www.bouldercolorado.gov/index.php?option=com_content&task=view&id=8774&Itemid=2973

Green Computers

The Climate Savers Computing Initiative is a nonprofit group of consumers, businesses and conservation organizations dedicated to promoting smart technologies that can improve the power efficiency and reduce the energy consumption of computers. Participating manufacturers commit to producing products that meet specified power-efficiency targets, and members commit to purchasing power-efficient computing products.

http://www.climatesaverscomputing.org/

Greenhouse Gasses

Greenhouse gasses are those which contribute to the greenhouse effect when present in the atmosphere. The Kyoto Protocol regulates six greenhouse gasses, as they are emitted in significant quantities by human activities and contribute to climate change. The six regulated gasses are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydro fluorocarbons (HFCs), per fluorocarbons (PFCs) and sulphur hexafluoride (SF_6). Emissions of greenhouse gases are commonly converted into carbon dioxide equivalent (CO_2e) based on their 100-year global warming potential. This allows a single figure for the total impact of all emissions

sources to be produced in one standard unit. Conversion factors of greenhouse gas to CO2e are calculated by the IPCC and Defra publish guidance on which set of conversion factors to use.

http://www.carbontrust.co.uk/solutions/CarbonFootprinting/carbon_footprinting_glossary.htm

LEED Certification

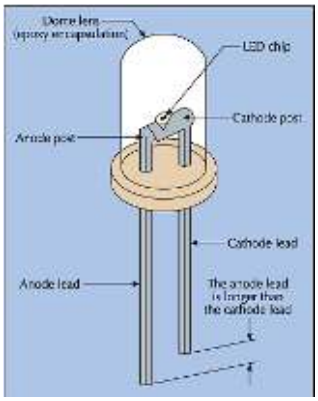
LEED is an internationally recognized green building certification system, providing third-party verification that a building or community was designed and built using strategies aimed at improving performance across all the metrics that matter most: energy savings, water efficiency, CO_2 emissions reduction, improved indoor environmental quality, and stewardship of resources and sensitivity to their impacts.

http://www.usgbc.org/DisplayPage.aspx?CategoryID=19

Light Emitting Diode

LED stands for light-emitting diode. LEDs are small light sources that become illuminated by the movement of electrons through a semiconductor material."

http://www.energystar.gov/index.cfm?c=lighting.pr_what_are#what_are



Living Building Challenge

A rigorous performance standard that defines the closest measure of true sustainability in the built environment, using a benchmark of what is currently possible and given the best knowledge available today.

http://www.ilbi.org/

Phantom Power

Also known as standby power, also called vampire power, vampire draw, phantom load, or leaking electricity, refers to the electric power consumed by electronic appliances while they are switched off or in a standby mode. A very common

"electricity vampire" is a power adapter which has no power-off switch. Some such devices offer remote controls and digital clock features to the user, while other devices, such as power adapters for laptop computers and other electronic devices, consume power without offering any features.

http://en.wikipedia.org/wiki/Standby_power

Power Purchase Agreement

Power Purchase Agreement (PPA) is a legal contract between an electricity generator and a power purchaser. The power purchaser purchases energy, and sometimes also capacity and/or ancillary services, from the electricity generator. Such agreements play a key role in the financing of independently owned (i.e. not owned by a utility) electricity generating assets.
http://en.wikipedia.org/wiki/Electric_utility

The seller under the PPA is typically an independent power producer, or "IPP." Energy sales by regulated utilities are typically highly regulated, so that no PPA is required or appropriate.
Under the PPA model, the PPA provider would secure funding for the project, maintain and monitor the energy production, and sell the electricity to the host at a contractual price for the term of the contract. The term of a PPA generally lasts between 5 and 25 years. In some renewable energy contracts, the host has the option to purchase the generating equipment from the PPA provider at the end of the term, may renew the contract with different terms, or can request that the equipment be removed.
Commercial PPA providers can enable businesses, schools, governments, and utilities to benefit from predictable, renewable energy.
In the United States, the solar power purchase agreement (SPPA) depends heavily on the existence of the solar investment tax credit, which was extended for eight years under the Emergency Economic Stabilization Act of 2008. The SPPA relies on financing partners with a tax appetite who can benefit from the federal tax credit. Typically, the investor and the solar services provider create a special purpose entity that owns the solar equipment. The solar

services provider finances, designs, installs, monitors, and maintains the project. As a result, solar installations are easier for customers to afford because they do not have to pay upfront costs for equipment and installation. Instead, customers pay only for the electricity the system generates. With the passage of the American Recovery and Reinvestment Act of 2009, the solar investment tax credit can be combined with tax exempt financing, significantly reducing the capital required to develop a solar project. Moreover, in certain circumstances the federal government will provide a cash grant in lieu of an investment tax credit where a financing partner with a tax appetite is not available.

Solar PPAs are now being successfully utilized in the California Solar Initiative's Multifamily Affordable Solar Housing (MASH) program. This aspect of the successful CSI program was just recently opened for applications.

http://en.wikipedia.org/wiki/Power_Purchase_Agreement

Premium Efficiency Electric Ballast

In the past several years, ballast manufacturers have begun offering high-efficiency electronic ballasts that provide the same light output as a standard electronic ballast but do so more efficiently, reducing lighting power by another 2-5W, typically 3W.

It is believed this will promote the most efficient ballast options to end-users and utility rebate program generic specs, creating pull-through in the marketplace, as occurred earlier with the NEMA Premium program for electric motors. More than 25 utilities, for example, use CEE minimum performance levels in their incentive programs. High-efficiency T8 electronic ballasts include instant-start, programmed-start and dimmable models; can be specified as low (<0.86), normal (0.86-1) and high (>1) ballast factor; are available with universal voltage; can be specified for operation of one, two, three or four lamps; and may include value-added features such as anti-striation and anti-arcing. They have no limitations compared to standard electronic ballasts.

High-efficiency ballasts can cost 10-20% more than standard electronic ballasts while producing an additional 5-7% energy savings in typical projects.

http://www.aboutlightingcontrols.org/education/papers/2008_nemaballasts.shtml

Presidents' Commitment to Climate Neutrality

The American College & University Presidents' Climate Commitment (ACUPCC) is a high-visibility effort to address global climate disruption undertaken by a network of colleges and universities that have made institutional commitments to eliminate net greenhouse gas emissions from specified campus operations, and to promote the research and educational efforts of higher education to equip society to re-stabilize the earth's climate. Its mission is to accelerate progress towards climate neutrality and sustainability by empowering the higher education sector to educate students, create solutions, and provide leadership-by-example for the rest of society.

http://www.presidentsclimatecommitment.org

Scope One, Two, Three Emissions

Also known as "source" one, two, three emissions.

Scope 1 GHG emissions are those directly occurring "from sources that are owned or controlled by the institution, including: on-campus stationary combustion of fossil fuels; mobile combustion of fossil fuels by institution owned/controlled vehicles; and "fugitive" emissions. Fugitive emissions result from intentional or unintentional releases of GHGs, including the leakage of HFCs from refrigeration and air conditioning equipment as well as the release of CH4 from institution-owned farm animals."

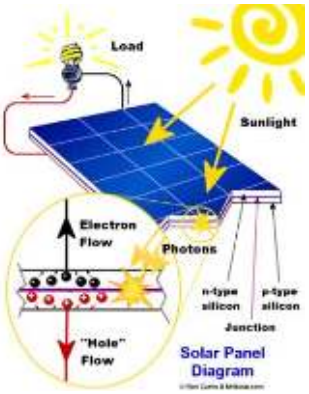
Scope 2 emissions are "indirect emissions generated in the production of electricity consumed by the institution."

Scope 3 emissions are all the other indirect emissions that are "a consequence of the activities of the institution, but occur from sources not owned or controlled by the institution" such as commuting, air travel for university activities, waste disposal; embodied emissions from extraction, production, and transportation of purchased goods; outsourced activities; contractor owned- vehicles; and line loss from electricity transmission and distribution" (ACUPCC Implementation Guide p. 11-12).

Solar Photovoltaic

PV cells convert sunlight (photons) into electricity (voltage) via the "photovoltaic effect." They are made of semi-conducting materials, the most common being silicon, which is the second most abundant element on the planet, exceeded only by oxygen.

http://www.namastesolar.com/index.htm



Windsource

Windsource®

Growing the renewable energy business in Colorado

With global climate change occurring rapidly and gaining public attention, more and more companies are looking for ways to reduce their environmental impact. Over 1,000 businesses currently use Windsource as a means to meet environmental goals, achieve LEED certification and position themselves as environmental leaders. More and more businesses are making the change to clean energy. Now Windsource gives Xcel Energy business customers the opportunity to help your company meets environmental goals, become LEED certified and position your company as an environmental leader all while supporting local, rural communities and future development of renewable energy sources. For a small premium you can chose how much renewable energy you would like to use by purchasing 100 kWh blocks or by choosing 100% Windsource. Windsource is available on a first-come, first-served basis. Once our wind energy is fully subscribed, you may be placed on a waiting list.

As a Windsource customer, we can help your business promote their green initiatives and inform your customers about your dedication to sustainability.

Resources:

Online Sign up form:
https://forms.escelenergy.com/_layouts/FormViewer.aspx?

American Wind Energy Association:
http://www.awea.org/

http://www.xcelenergy.com/Colorado/Business/Rene

wableEnergy/Windsource_/Pages/Windsource.aspx

Zero Waste

Zero waste suggests that the entire concept of waste should be eliminated. Instead, waste should be thought of as a "residual product" or simply a "potential resource" to counter our basic acceptance of waste as a normal course of events. Opportunities such as reduced costs, increased profits, and reduced environmental impacts are found when returning these "residual products" or "resources" as food to either natural or industrial systems. This may involve redesigning both products and processes in order to eliminate hazardous properties that make them unusable and unmanageable in quantities that overburden both industry and the environment.

http://www.zerowaste.org/index.htm