Fort Lewis College Sustainability Action Plan




2010 – 2015

Pathways to Sustainability

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Preface

A common definition of sustainability is the ability to meet its needs without sacrificing the ability of future generations to do the same. At Fort Lewis College, challenging our students, staff, and faculty to create a sustainable institution is critical to achieving our mission of preparing citizens for the common good in an increasingly complex world.

As Fort Lewis College moves toward a sustainable future, this plan will serve as the map. It will balance and integrate the environmental, economic, and social realms of our institution and chart the shortest and best route for the College to reduce its impact on the Earth and improve the quality of the Fort Lewis experience for students, staff, and faculty.

This plan is the result of over two years of work by students, staff, faculty, and administrators. As with all good plans, it will help Fort Lewis College make decisions and set priorities. It outlines specific targets and the actions the College can take to achieve them. It describes costs and benefits and how the College can track its progress over time. In short, it provides a common reference point that will help everyone think together about the meaning of sustainability for Fort Lewis.

Our Sustainability Action Plan also helps us to meet our responsibilities for the American College and University Presidents Climate Commitment (ACUPCC). Fort Lewis College is proud to be a charter signatory of this important commitment that clearly demonstrates how institutions can address the climate crisis.

Finally, this plan wouldn't have been possible without the initiative and passion of Fort Lewis College students. I want to thank the work of the students over the past two years. They have been asking the important questions and, through creativity and determination, have found many of the answers.

Sustainability is a core commitment of Fort Lewis College and is integral to a liberal arts education. This document is the beginning of an important conversation, not the last word. So, let's start talking.

Sincerely,

Brad Bartel

President Brad Bartel

Introduction

Drafting Fort Lewis College's Sustainability Action Plan has itself served to move our institution further down the path toward sustainability. The planning process has introduced the idea of sustainability to departments across campus. It has brought people together to share information that before was scattered and inaccessible. It has also demonstrated the power of constructive conversation as students, staff, faculty, and administrators have participated in three years of debate, discussion, questioning, and problem-solving in order to create this plan.

This process began with the Environmental Center's participation in the 2007 Rocky Mountain Sustainability Summit at University of Colorado-Boulder. During the conference, we witnessed colleges and universities signing on to the American College and University Presidents Climate Commitment (ACUPCC). Then in its beginning stages, it was clear that the Commitment was gathering momentum and would become a sign of leadership on campus sustainability issues within higher education. It also became clear that creating a Sustainability Action Plan could provide an effective framework to organize and advance the discussion on our own campus, which tended to drift from topic to topic without a clear sense of what should be our priority.

Upon returning to Fort Lewis, President Bartel agreed with our assessment. On April 6, 2007 he made Fort Lewis a charter signatory of the ACUPCC prior to the Earth Week keynote address by noted author David Orr about the climate crisis. The following summer the College selected the firm of Woodard and Curran to assist with the first-ever campus sustainability assessment, which gathered disparate information about all aspects of campus operations and resulted in our first greenhouse gas inventory.

As 2007 became 2008, the Environmental Center began working with first-year students in an honors class to generate goals and ideas for moving the process forward. The students facilitated two study circles for each of seven topics: energy, transportation, water and land-use, purchasing, waste and recycling, and environmental health. Over sixty people participated in these meetings and helped answer three questions:

- What should be the performance goals for our institution?
- What should be at the College know about this topic?
- How can we best serve the region on this topic?

Throughout the 2008-09 school year, a committee of students met at the Environmental Center to draft the different sections of this plan. Each month a Coordinating Committee reviewed the work of the students and suggested revisions to the goals, objectives, targets, and action steps they had proposed. Each section of the plan then moved on to the Presidents Advisory Council on Environmental Affairs

(PACEA) for further review and refinement. In between these sessions, students worked behind the scenes researching programs at other colleges and universities to come up with ideas and cost estimates for the next section of the plan.

During the fall of 2009, the Environmental Center presented portions of this draft plan to individuals and groups across campus to bring more people into the conversation and confirm that the targets and action steps were appropriate for the institution. The reaction from the campus was uniformly positive and supportive. In December, PACEA decided on final changes and President Bartel approved the plan.

While the Sustainability Action Plan provides targets and action steps for the next five years, the appendices included at the end of the plan outline strategies Fort Lewis can use to achieve climate neutrality. These documents fulfill the requirements of the Presidents Climate Commitment and provide the best overview of how Fort Lewis is approaching climate issues over the long-term.

Some plans sit on a shelf and gather dust. Others catalyze action and provide structure and organization for the process of change. There are already strong signs that this plan will fall into the latter category. Since completion of the initial draft the College has brought its sustainability efforts under the umbrella of the Pathways to Sustainability program, launched a website and created a logo to brand the program. This coincides with the construction of three new buildings, all of which will meet at least a LEED-Silver designation.

The Environmental Center will continue to play a leading role in implementing the Sustainability Action Plan, but for the plan to truly be effective, the campus needs to establish a Campus Sustainability Office. This is a key recommendation of the plan. Difficult economic times, however, necessitate the type of creative solutions at which Fort Lewis has become quite adept. To understand how the plan will move forward in the very near future, the appendices attached to the Coordination and Support section outline immediate steps and institutional priorities to achieve sustainability. An Executive Summary of this plan is also available that provides a snapshot of the action plan on the new Pathways website and the Environmental Center is also available to answer questions about the plan.

Marcus Renner

Director, Fort Lewis College Environmental Center

January 2010

Section Title - Stewardship

Context & Current Situation

In general, it has been individual effort and investments in specific equipment that has led to conservation of campus resources. While effective, the College has never organized these initiatives under the broad banner of "stewardship." This section provides an opportunity to relate these issues together and give new purpose to environmental conservation on campus.

In terms of water, the City agreed to provide low-cost water for the College when it moved to Durango in 1956. This has provided little financial incentive for measurement of water use and subsequent conservation. In addition, because the water rights on the Animas River are under-appropriated there has been little political pressure for Fort Lewis to make the most of the water it does use. Despite this, PPS has installed a large number of low-flow devices and a state-of-the-art irrigation system. The broader demand for water from the Animas and other western rivers will, of course, only grow and climate scientists forecast that southwest Colorado could see a 15% drop in water resources over the next several decades.

The landscaping on campus consists of few "natural" areas receiving minimal management, plantings of native shrubs and trees, and large expanses of lawn that require consistent upkeep and irrigation. There is a strong desire among staff to move toward the use of native plants on campus and to connect the campus landscape to the curriculum. The constraints to moving in this direction are the expectations for a more traditional campus aesthetic among some members of the campus community and the cost of installation and maintenance of these native plantings. A more native, self-sustaining landscape will cost less to maintain, but defending such an area from invasive species at least initially, is labor intensive.

Using native plantings to help clean stormwater through the use of bio-swales and the daylighting of storm drains is another opportunity to showcase stewardship on campus. Such areas can provide important habitat for wildlife. The old City Reservoir, located on the current site of the softball fields, once attracted a diversity of bird life and provided a home for aquatic organisms that proved useful for biology classes. The presence of wildlife on campus raises another issue that's important to consider. Bears, mountain lions, deer, coyotes, and prairie dogs all live around the main campus and each brings their own management issues. With its proximity to wild areas such as Raider Ridge and Horse Gulch, Fort Lewis could provide a model for responsible management in the transition zone from wild land to urban neighborhoods. The construction of new buildings on campus provide an opportunity to install more native landscaping and to better understand these issues There are opportunities to work with student groups such as SEEDS-Campus Ecology on restoration projects and wildlife monitoring and management.

Beyond the main campus, the College and the FLC Foundation currently own over 600 acres in Horse Gulch. There is the very real threat of development of private lands in the area, which could pressure the College to grant an easement for a road across its land. In 2000, this scenario unfolded with the proposed Fairplay Condominiums, which caused considerable controversy and was eventually resisted by the College. The City and the County are both interested in working with the College to ensure preservation of the Gulch as open space, and the College has stated it will give the City the right of first refusal for an offer on its land. In the last year, the City has moved aggressively to acquire land in Horse Gulch. Consolidating ownership will make preservation of open space in the Gulch more likely. The County, however, is negotiating right-of-way easements with Oakridge Energy, the primary private landholder in the area, and the configurations of these proposed roads is a major issue. Being proactive and evaluating the various options with regard to the College's land in the area will help the college avoid controversy and make a wise decision with regard to its land.

Fort Lewis also has connections to 6300 acres at the Old Fort Lewis campus south of Hesperus. This property provides an opportunity for a number of demonstration projects related to sustainability, including the restoration of buildings, the generation of renewable energy, and sustainable agriculture. For example, during the spring of 2008, Fort Lewis was approached by an energy company interested in building a 2 MW solar farm. FLC and the State Land Board decided not to move forward with the project. The company was interested in selling the renewable energy credits associated with such a project and so it would not serve to offset FLC's carbon emissions. The offer, however, made the potential uses of this property as a demonstration site more concrete.

The State Land Board oversees the land for the benefit of Fort Lewis College and until this year had intended to continue leasing the property to CSU Extension for an agricultural research station. CSU is now planning to end its lease on the property by June 2010 leaving open the question of who will get to use the property. The Fort Lewis College Board of Trustees has stated its desire for Fort Lewis to hold the master lease for the property and be involved with all management decisions on the property. An Old Fort Task Force comprised of faculty and staff is drafting a management plan so that if the Fort gains the lease it will be in a position to responsibly manage the property. Other constraints to the use of the Old Fort for sustainability project include the short season for growing food at its 7,300 foot elevation, the difficulty of improving the energy efficiency of historic structures, and the ½ hour drive to get to Old Fort from Durango. Despite these obstacles, the Old Fort is a significant asset that can also support the portions of the Sustainability Action Plan related to education and engagement, service to the region, and climate.

Finally, an important part of stewardship is the management of pollution and toxic materials. In June of 2008, the college created a new full-time position for an Environmental Health and Safety officer. With the creation of this position there are new opportunities to address many of the goals and objectives generated by this planning process. In addition, the Biology Department has proposed a new Environmental Health and Safety Major that will provide additional opportunities for student involvement in these issues. The primary constraint in the past has been the lack of coordination between various departments and the limited amount of time for staff and faculty to pay attention to these issues.

One pollution issue that other campuses have made progress on is on-site treatment of wastewater from buildings through underground wetland systems or living machine technologies that can clean sink and toilet water. Current regulations would require that the College get a special exemption to do any wastewater treatment on campus. The Colorado School of Mines received such an exemption by tying the project into a regular class and student research. Nationwide, the regulations for on-site wastewater treatment are becoming more flexible and the Colorado regulations are currently under review.

Strategic Direction

Sustainable management practices become integral to the educational environment of the College.

Goals & Objectives

The following symbols are included after some of the goals, objectives, indicators, and action steps listed below:

☼ - Part of the campus sustainability rating system from the Association for the Advancement of Sustainability in Higher Education (AASHE). Two stars equal a priority rating point.
WC – Recommendation from the consulting firm of Woodard and Curran; (√ means a "low-hanging fruit;" ◙ means a priority recommendation)

Goal 1: Reduce water use in building and on grounds
Specific Objectives
- Minimize use of irrigation
- Minimize water use within building (☼☼)

Goal 2: Convey a clear commitment to sustainability through the campus landscape
Specific Objectives
- Increase sustainable landscaping for biodiversity, water quality, food production, and elimination of synthetic chemicals (☼☼)
- Work with the State Land Board and other partners to ensure sustainable uses of the Old Fort property
- Work with the city and county to ensure preservation and sensitive use of Horse Gulch

Goal 3: Ensure FLC maintains the healthiest possible environment at all times for its community members
Specific Objectives

- Reduce the amount of hazardous and toxic materials used on campus (☼☼)
- Provide a healthy indoor environment for the FLC community
- Ensure healthy and safe food products for FLC campus

Note that the names that appear in **bold** are the parties that would have primary responsibility for the listed action item. Other names listed would be involved in the planning or implementation.

Goal 1: Reduce water use in building and on grounds

1.1 Minimize use of irrigation

Potential Indicators	Chosen Indicators
Gallons/year used for irrigation Gallons/acre/ year used for irrigation Gallons/ landscaped acre/year used for irrigation Total number of acres under irrigation Number of acres classified as "high-water" and "low-water"	Gallons/square foot of landscaped area/year used for irrigation
Rationale Because there plans to add athletic fields to campus in the master plan the College decided to use a "per square foot" measure of irrigation. This is really a measure of irrigation efficiency and over the long-term will allow us to meet our objective. The city tracks the amount of water sent to the College's irrigation pond and Fort Lewis has a meter that measures how much water we draw from the pond and use for irrigation. This meter resets itself every 10 million gallons and requires checking to gauge our water use. We can use this measure both overall irrigation and irrigation efficiency, though it is not a precise measurement system. The AASHE rating system asks for this measure in acre feet.	

Current Situation at FLC	Targets at Other Schools
FLC compares favorably to other schools in that only 21% of our campus land receives irrigation. According to the City of	In 2006, UCCS used 8.4 million gallons of potable water to irrigate 74 acres, although most of this acreage is covered by

Durango, over the last four years it has pumped an average of 76 million gallons a year into the irrigation pond. In 2008, FLC estimated the amount of water used to irrigate 60 acres of landscaped area at 44 million gallons. This is 730,000 gallons/acre or 16.76 gallons/square foot of landscaped area. At 7.5 gallons per cubic foot that equals 26.8 inches of precipitation per year. If you estimate a 30 week season it averages out to 0.9 inches per week. If you look at all of FLC's 285 acres, which includes the hill slopes, these numbers decrease to 153,684 gallons/acre or 3.53 gallons/square foot. Over this period FLC lost 25 million gallons of water to evaporation and percolation. The athletic fields use more water than the rest of campus. Central campus also has older irrigation lines and fixtures and also uses a greater amount of water.	concrete. They have set a target of reducing gallons/square foot by 10% over five years. The UCCS plan notes this is a recommended target of a state executive order. Colorado College uses 38 million gallons to irrigate 40 acres. This is 938,000 gallons/year. Here is percentage of irrigated acreage at other regional schools. • UCCS – 25.8% • Boulder – 80%, non-potable water • Colorado College – 39% • NAU – 54.2%, 65% of the 54.2% is irrigated with reclaimed water

Recommended Target	Action Steps	Responsible Parties	Cost/Resources Needed
Increase in irrigation efficiency (decrease in gallons/square foot of landscaped area/year)	In landscaping new areas, use plants that will require minimal irrigation after plantings become established. Research the actual impacts of irrigation on our river system Ensure that runoff from roofs of new buildings is routed to irrigate surrounding landscapes Allow non-recreation turf areas away from central campus to receive less water Assess utility of converting turf	**Contractors**, PPS **Students** **Contractors** **PPS** **Students,** PPS	If the College adds new areas that require irrigation (e.g. roundabout or softball fields), other areas would need to receive less water to meet this target. There are no specific costs associated with this target. **Benefit/Payback Period** Avoided costs would include materials for the irrigation/sprinkler lines, fertilizers, the energy used for pumping, staff time.

	grass areas to native, drought-tolerant landscaping based on experience of native landscaped areas around student union.		

Rationale

The fact that we use non-potable water and that we have a state of the art irrigation system means that further improvements in irrigation efficiency will depend primarily on reducing the area that requires irrigation. Converting to more native landscaping will reduce costs for fertilizers, energy for pumping, and decrease the number of acres for grounds staff to maintain, but replacing turf grass with native plants is extremely expensive. For students to convert a tenth of an acre to a natural area through manual labor and seeding of native grasses would cost about $1500-2000.[1] For students to manually install a shrub bed of one-tenth of an acre would cost about: $9000[2] Hiring a contractor to clear turf and install plants would range from about $12,000-$42,000.[3] The native landscaping areas around the new Student Union will provide opportunities to understand how to establish and maintain native landscapes on campus. The design calls for native shrubs in a more formal "alumni garden," an area with native perennial grasses and wildflowers, and a native shrub area between the building and the EBH parking lot. The Environmental Center has agreed to assist Physical Plant with maintaining each of these areas in order to better understand the potential to establish similar areas around campus. Many of the shrubs in the "alumni garden," for example, will produce berries that students from the Environmental Center can gather.

While the loss of irrigation water to percolation and evaporation is significant, this water does eventually find its way back into the Animas River and so the relative environmental impact of this water loss is low. Preventing this water loss would be extremely expensive. Calculations suggest that it would cost $60,000 for pond improvements ($30,000 for liner and $30,000 for installation) to correct this problem. Setting targets related to water use should also take into account the specific characteristics of our watershed in order to determine a "sustainable draw" from our local river system.

[1] Cost of a native grass seed mix from Southwest Seed.
[2] Cost includes: 4800 sq. feet of weed fabric, mulch, 5-gallon shrubs at $25/each spaced 5' apart
[3] The lower number assumes students installing the plants, mulch, and weed fabric. The higher figure is for a contractor to do this work.

Participants in the planning process discussed drip irrigation for campus landscaping but this is not necessary practical for lawns and many of the shrub areas already require very little water. One action that might become possible in the future is the use of reclaimed wastewater from buildings for irrigation. This is currently not allowed under Colorado state regulations but this could change.

1.2 Minimize water use within building ☼☼

Potential Indicators	Chosen Indicators
Gallons/year Gallons/per person/year Gallons/square foot of building space/year	Gallons/person/year
Rationale We felt it was most appropriate to use gallons/person/year. AASHE uses gallons/square foot of conditioned building space so as to not penalize institutions for growth, but we felt that people use water, not buildings, and so measuring per capita would be a better indicator. . There is currently a single water meter that measures potable water use within all the buildings. The lack of water meters on individual buildings is a major hurdle to achieving reductions. If water meters for each building prove too expensive, installation at strategic locations could allow the College to determine how much water particular departments on campus (e.g. residential life, athletics, campus dining, etc.) are using and monitor these specific areas for reduction. Metering and sub-metering of potable water use will earn LEED-Existing Building credits	

Current Situation at FLC	Targets at Other Schools
Over the last five years, FLC used an average of 34.64 million gallons per year. This is roughly 2% of the total used by residents in the City. Average water use per person at Fort Lewis for 2006-07 was 7,599 gallons per person and 8,353 per student. This is much lower than the national average. Most FLC students,	CSU has reduced water use by 22% since 1990 CU-Boulder from 2001-2005 decreased water use 10-20% each year, though this includes irrigation.

however, live off campus and this skews the results. Over the last two years, the College has decreased its water use by just over 9%. The last inventory of low-flow fixtures on campus indicates the following • Sinks 635 low-flow out of 1218 (52%) • Showerheads - 262 low-flow out of 449 (58%) • Toilets - 405 low-flow out of 691 (59%) • Urinals - 81 low-flow out of 133 (61%) The city bills Fort Lewis for sewer usage based upon the total amount of water purchased by the campus. During the 2006-2007 academic year, Fort Lewis paid a total of $133,769 for water used in buildings. The gallons per minute (gpm) standards for fixtures in the new buildings going up at FLC are: • 1.25 toilets • 1.5 showerheads • 0.5 lavatories/hand sinks • 1.5 kitchen sinks	UCCS has set a five-year target of reducing water use in existing buildings by 10% and ensuring that all new buildings achieve a 20% reduction in water use. UBC seeks to reduce water use in buildings 40% below 2000 levels by 2010 LEED-EB credit requires that plumbing systems build before 1993 should achieve water usage 160% above current code requirements; after or in 1993 the requirement increases to 120% or less. LEED credits can be garnered for reductions from low-flow fixtures between 10-30%.

Recommended Target	Action Step	Responsible Parties	Cost/Resources Needed
5% reduction in gallons per person over five years	Update the inventory of low-flow fixtures in campus buildings	**Students**, PPS	Staff time would be necessary to help students with the inventory and research.
	Install low-flow fixtures and water-saving appliances in all new buildings (e.g. front-loading washing machines) ☼	**Contractors**	Low-fixtures would likely be a part of any new building project.
	Create a formal water conservation policy	**Students**, PPS	Flow restrictors would cost $3 each. To put restrictors on all the non-low-flow sinks on campus would cost $1900.
	Identify vandal-proof showerheads for use in the resident halls	**Students**, PPS, Student Housing	Installing low-flow, tamper proof showerheads on showers that are not low-flow would cost $2200 or $11.75/showerhead.
	Install flow restrictors on sinks that don't have them ☼	**Students**, PPS, Student Housing	**Benefit/Payback Period** The payback period on sink aerators would be about 12 years and would save the College $150/year. This would save over 38,000 gallons a year. The payback period on low-flow showerheads would be almost immediate and would continue to save the College roughly $16,000/year.

Rationale

While water is extremely inexpensive for the college ($0.004/gallon), the cost will likely increase. Over the last five years, the total cost of water and sewer has gone up 23%. These cost increases suggest that over time water conservation will have a quicker payback.

Governor Ritter's Greening Government Executive Order mandates a 10% reduction in water use by 2012. We can potentially reach this goal by combining savings from buildings with reductions in irrigation. We do assume that reductions will occur with the renovation of the Student Union Building, the new residence hall, and the new biology wing of Berndt Hall as old fixtures in these locations are replaced with low-flow devices. To achieve more reductions it would be most effective to focus on showerheads and then flow restrictors on sinks. This is a good hands-on project for students. Replacing the remaining regular toilets with low-flow (1.25 to 1.6 gal/flush) toilets would cost $28,600 at $100/toilet. The payback period on toilets would be 22 years and would save the College over $1300/year. It would save 328,230 gallons a year. But because the payback period is so long, we have not included this as an action step in the plan. Our estimates for costs and savings from low-flow fixtures are based on the following assumptions: Sinks - 6 seconds/use for 3 uses/day; Showers 8 minutes per use, 1 use per day; Toilets - 3 uses per day; Urinals - 2 uses per day.

We also felt that improving our ability to measure water use by installing meters on individual buildings is very important. Water meters would likely cost $5,000 each. This would be most practical for a single building that uses a great deal of water such as the gym. We felt that going building by building in this way and educating the campus about the savings from improvements could get people to become more conscious about their water use and reduce water use across campus.

Another way to save water would be to install an automatic filter-cleaning system for the pool. Chuck Atwood in PPS said it would be difficult to tell how much water the filtering system would save before installation, but that it would prevent unnecessary flushing of the system. There are also benefits to reducing the energy needed to heat the pool. This is addressed within the climate section of the report. Obtaining this type of filter system is on a "wish list" at Physical Plant, but it is fairly expensive.

We did not set a goal related to on-site wastewater treatment because of current state regulations that require a complicated permitting and monitoring process. In the past we have discussed a demonstration project that would clean wastewater from particular buildings but could still be sent it to the water treatment plant. This would have educational value and would reduce cleaning necessary at the treatment plant, but would likely not appreciably reduce our sewer fees.

Setting targets related to water use should also take into account the specific characteristics of our watershed in order to determine a "sustainable draw" from our local river system.

Goal 2: Convey a clear commitment to sustainability through the campus landscape

2.1 Increase sustainable landscaping for biodiversity, water quality, food production, and elimination of synthetic chemicals (☼☼)

Potential Indicators # of acres serving one of the sustainability functions above % of acres serving one of the sustainability functions above Sustainable land-use index (to be created) Specific indicators could be developed for each of these four aspects of sustainable landscaping to give a more detailed picture of our performance. For example: Biodiversity – land designated for protection, health of existing natural areas (measured by species richness and abundance, % of invasive plants, presence of indicator species), restoration of degraded areas, % of native vs. non-native plants installed in landscaping Water quality – area covered by impervious surfaces, % of the length of drainage lines connected to a stormwater feature, water quality of stormwater running through the system Food production – acres used for food production, pounds of food harvested from campus land Elimination of synthetic chemicals – acres designated as "chemical free"
Chosen Indicators # of acres serving one of the sustainability functions above
Rationale

Without a baseline, the number of acres serving these functions is the most straightforward to administer. We felt creating a sustainable land-use index would be a good student project and could incorporate the specific measures mentioned above. Very few campuses have detailed measures and indicators for sustainable landscaping, and FLC could make its mark simply by creating an assessment system. Using the more specific measures would provide a fuller picture of our performance. The College could use such an index in the next update of the action plan.

Current Situation at FLC	Targets at Other Schools
We currently do not have complete baseline information on the functions listed above. We know that FLC manages 114 of its 285 acres as natural habitat. This land includes the steeply sloped land on the sides of the mesa, but does not include land in Horse Gulch. Biodiversity - Of the land on campus proper, the John F. Reed Natural Area has the greatest habitat value. The College has given it permanent protection as part of gaining LEED credits for its new building projects. The Old Campground area behind the Bader Snyder residence halls is a natural area but has degraded because of heavy mountain bike use. There are also a number of native plantings on campus that support some aspect of biodiversity and new bee hives support native plants and enhance biodiversity. We have about 45 acres of turf grass on campus. Water Quality - FLC currently has some informal areas that serve to filter stormwater but we have no water quality data. There are plans to install a major stormwater feature in the center of campus and to draft a stormwater management plan that will cover about half of campus. Impervious surfaces cover only 9.6% of our 285	Survey[4] of campuses nationwide shows: • 34% use native or low-water plants across campus • 40% have some habitat restoration program • 39% have programs to provide wildlife • 20% have set aside half of acreage for protection University of Victoria-British Columbia is proposing the following short and long-term draft targets: • Impermeable surface – ST 50% or less; LT 15% or less • Healthy Natural Areas – ST 50% or more; LT 100% • Restoration of Degraded Areas – ST 30%; LT 80% • Pesticide & Herbicide Use - LT Eliminate use • Annual Plant Installations – ST 50% native; LT 100% • Protection of Natural Areas Given Long-term Protection – ST 25%; LT 100% UC-Santa Cruz has 55% of its acreage set aside in its long-range master plan as Campus Natural Reserve; it has reduced its pesticide use to approximately 250 lbs. of active ingredients. UC-Berkeley has a policy to keep the amount of impervious

[4] 2008 National Wildlife Federation Campus Sustainability Report Card

acres. Food Production - Together the EC garden and orchard comprises about a quarter of an acre. FLC uses a number of wild edibles on campus for landscaping. Elimination of Synthetic Chemicals - Currently 79% of our land escapes treatment by synthetic chemicals. Total yearly expenditures on fertilizer and herbicides for the turf grass is $4,344.56	surface on campus to fewer than 60%. Willamette University has reduced synthetic chemical use by 90% by using organic fertilizers in combination with special blends of compost tea specifically tailored to soil conditions. A number of western schools have a campus garden or farm: • Evergreen State College – 1 acre • Western Washington University – 5 acres • Prescott College – 30 acres • New Mexico State University – 1.5 acres • Cal State-San Luis Obispo – 10 acres • Humboldt State University – 2 acres • Colorado Collage – 1.5 acres • University of Montana – 6.5 acres

Recommended Target	Action Step	Responsible Parties	Cost/Resources Needed

Net increase of 2 acres in the amount of land serving one of the sustainable functions listed above	Create a methodology to evaluate the sustainability of the campus landscape and define terms such "a healthy natural area" and a "stormwater feature."	**Students** and faculty	The college should be able to meet this target by: • using native landscaping in the design of new buildings • completing the central campus stormwater project as money becomes available through the state • eliminating the use of herbicides in native shrub beds • supporting small student projects related to sustainable landscaping and funded by grants The student projects do cost some staff time for effective coordination with PPS
	Conduct a baseline assessment of the sustainability of campus landscape.	**Students** and faculty	
	Create and enhance habitat on campus, especially the Old Campground area behind Bader Snyder residence halls. (WC √, ☼)	**Students** and faculty	
	Install bird house, owl and bat boxes and native plants that support pollinators	**Students**	
	Research techniques for replacing turf grass with native sod grasses	**Students** and faculty	**Benefit/Payback Period** Converting more of the land to natural habitat would reduce maintenance responsibilities of PPS staff. There could be financial savings from reducing use of fertilizers and other chemicals. Increased food production also
	Create a wildlife management plan to support biodiversity and reduce risks to humans	**Students**, faculty, PPS, EHS	
	Specify management goals for portions of campus lands not maintained by the grounds	**Students**, faculty, PPS	

	department. Complete the Central Campus stormwater project in the center of campus Test organic substitutes, such as compost tea, for chemical fertilizers on campus lawns Assess utility of converting turf grass areas to native, drought-tolerant landscaping based on experience of native landscaped areas around student union. Do water quality testing on stormwater (WC) Increase land dedicated to food production on main campus by ¾ of an acre	 **Contractor**, PPS PPS, EHS, Faculty, Students **Students** and faculty **Students** and PPS **Students** and faculty **Students**	supports other portions of plan related to local and healthy foods and compared to native landscaping is relatively inexpensive.
Rationale We believe that two acres is a reasonable low target for sustainable landscaping and is attainable through completion of large stormwater project currently planned for central campus and the small, student-initiated projects that can receive grant funding. The cost of converting lawn to native landscaping is significant. For students to convert a tenth of an acre to a natural area through manual labor and seeding of native grasses would cost about $1500-2000.[5] For students to manually install a shrub bed of one-tenth of an acre would cost about: $9000[6] Hiring a contractor to clear turf and install plants would range from about $12,000-$42,000.[7]			

[5] Cost of a native grass seed mix from Southwest Seed.
[6] Cost includes: 4800 sq. feet of weed fabric, mulch, 5-gallon shrubs at $25/each spaced 5' apart

Because of this expense, we believe focus should be placed on improving the health of existing natural areas rather than creating new areas. As written, these targets would not encourage the replacement of areas that are currently paved with sustainable landscaping or with pervious paving. Currently impervious surfaces cover only 10% of campus and so further investment in this area should not be a priority.

The cost of installing stormwater features on campus would typically be hundreds of thousands of dollars if not more and would require state funding so making progress on this type of land-use is dependent on outside factors, though students might be able to construct small catch basins

To produce compost tea as a fertilizer substitute would be a one-time cost $500-$1000 for materials. The Environmental Center will be experimenting with different blends on tea as an additional component to its demonstration garden program. There are questions about the nitrogen content of compost tea as opposed to chemical fertilizers. If successful, this switch would more than pay for itself. A 50% reduction in chemical fertilizers would save the College about $2100/year.

Other ideas discussed: Map and inventory wild edibles on campus lands, inventory all campus trees and landscape assets ☼, research what integrated pest management techniques are appropriate for our region, research water soluble organic fertilizers, add storm-drain stencils around campus

2.2 Work with CSU and other partners to ensure sustainable uses of the Old Fort property

Potential Indicators	Chosen Indicators
# of sustainability projects taking place on the property progress on a sustainable management plan for the property	# of sustainability projects taking place on the property
Rationale The Old Fort Task Force is currently meeting to devise a management plan for the property that will help coordinate different projects at the Hesperus campus.	

[7] The lower number assumes students installing the plants, mulch, and weed fabric. The higher figure is for a contractor to do this work.

Current Situation at FLC	Targets at Other Schools
Currently the property has an experimental garden plot, two seasonal hoop houses, and a strawbale greenhouse. Professor Beth Lashell is working on an organic weed management program. The EC has collected wind data for the property. Laurie Williams in engineering has done experiments with a methane digester. The potential for integrating green building principles and technologies into the renovation of the library is under investigation. Last year, an energy company approached FLC about installing a solar farm on the property.	While several campuses have their own research stations, farms, arboretums, and natural areas, n other campus has such a unique combination of assets on a single property.

Recommended Target	Action Step	Responsible Parties	Cost/Resources Needed
Create a demonstration campus for sustainable practices and technology that becomes fully integrated into the educational experience of FLC.	Explore opportunities to apply green building principles and technologies into the restoration of the library building. Research the potential to use the land at the Old Fort for carbon offsets through forestry management. Conduct an inventory of the natural resources on the Old Fort property Draft a sustainable management plan for the Old Fort Lewis Campus Conduct a feasibility study for	**Office of Community Services** **Students** **Office of Community Services**, faculty, and students **Old Fort Task Force** **Contractor**	Staff time to do the research and work with students to collect data. A feasibility study for a solar farm on the Old Fort property would cost $2,800. **Benefit/Payback Period** There is no immediate financial benefit from work at the Old Fort, but long-term a demonstration campus focused on sustainability could serve as an important recruiting tool. A solar farm on the property could payback to the College, though this would depend on a detailed feasibility study.

	on-site solar power generation.		

Rationale

We currently have three projects related to sustainability at the Old Fort property (organic weed management, seasonal gardening and greenhouse work, and methane digester heating). The Old Fort Task Force is in the early stages of drafting a management plan for the property while we wait for a response from the State Land Board about the Fort Lewis College request to hold the master lease on the property.

We have discussed conducting a feasibility study for renovating other historic buildings while increasing energy efficiency. This would cost roughly $10,000 for detailed energy audit of most buildings on campus

We have also discussed installing a small wind turbine to generate electricity for the research station. Our best estimate for this cost is $30-$45,000 and based on electric bills would have a payback period of 10-15 years.

Hoop houses for vegetable growing would cost $1,000 to $2,000/each. The challenge is hiring students to tend them.

Additional ideas discussed include: Exploring the potential for microhydro power generation and small biomass heating systems and doing an environmental health assessment of the buildings

2.3 Work with the city and county to ensure preservation and sensitive use of the land owned by public entities in Horse Gulch

Potential Indicators	Chosen Indicators
• Communication between College, City, and County about Horse Gulch lands • Use of Horse Gulch by the College for education and research • Quality of wildlife habitat in Horse Gulch • Water quality in Horse Gulch	• Communication between College, City, and County about Horse Gulch lands • Use by the College for education and research • Quality of wildlife habitat in Horse Gulch • Water quality in Horse Gulch

Rationale
All of the potential indicators have value. As the College is now in negotiations with the City to sell its properties, the amount of communication between the City, the County, and the College is essential.

Current Situation at FLC	Targets at Other Schools
Through a grant from the Ecological Society of America and the ENVS 495 class, the College now has baseline information on the wildlife habitat, water quality, historical resources, and land ownership of Horse Gulch. Ongoing study of the area by students during the 2009-2010 school year will provide a stronger basis to decision-making by the College, the City and the County.	Similar to the Old Fort, the potential to use lands in Horse Gulch is unique and does not have strong parallels at other campuses.

Recommended Target	Action Step/Ideas	Possible Responsible Parties	Cost/Resources Needed
Permanent open space protection for Horse Gulch through the sale of College lands to the City of Durango	Explore options of selling the development rights or the title to the Horse Gulch lands to a third party or public entity such as a land trust or the City.	**FLC administration**	None **Benefit/Payback Period** The sale of Horse Gulch lands to the City will generate important funds for the College. Ensuring that faculty and students will continue to have access to the land for projects and research will provide added benefit to the College
	Continued collection of basic information on vegetation, water quality, and wildlife.	**Faculty** and students	
	Complete of research to close information gaps about Horse Gulch	**Faculty** and students	
	Creation of a web page to promote Horse Gulch as a campus resource	**Students**	

	Assist the City of Durango with a Horse Gulch cleanup	**Students**	
Rationale The sale of Horse Gulch lands to the City of Durango will not only help ensure its protection as open space, it will allow the College to avoid a situation where development forces the College to make a controversial decision. Assuming the completion of this transaction, the next step is to continue to collect data on Horse Gulch in order to help the City manage the area. Ongoing water quality testing is especially important.			

Goal 3: Ensure FLC maintains the healthiest possible environment at all times for its community members

3.1 Reduce the amount of hazardous and toxic materials on campus and ensure proper disposal ☼☼

Potential Indicators	Chosen Indicators
Lbs. of hazardous materials purchased Lbs. of hazardous materials purchased/student Lbs. of hazardous materials purchased/square feet of building space $$ spent on hazardous materials/year Lbs. of hazardous waste/student % of classes using only low-hazard materials Total volume of pesticide and herbicides used Total volume of pesticide and herbicide used/acre Total volume of indoor pesticide used/square feet of building space Percentage of hazardous materials rated 2, 3 or 4 according to the HMIS® III health rating system	Lbs. of hazardous materials purchased/student Lbs. of hazardous waste/student Total volume of pesticide and herbicides used Total volume of indoor pesticide/square feet of building space
Rationale	

The HMIS® III health rating system was developed to assess the health hazards according to OSHA regulations. Materials rated 0 or 1 pose a minimal or slight hazard; a rating of 2 signifies that "prolonged exposure may affect the central nervous system;" ratings of 3 and 4 pose more serious threats. Monitoring this objective will require either working through our purchasing department to track these substances or annual audits that will provide a snapshot at a single point in time. Getting the full picture by working with purchasing is preferable. This would include the volume used by contractors, such as Orkin, which use poison and pesticides to deal with insects and rodents. A per student calculation seems most appropriate since most of this will allow for increases in enrollment.

Current Situation at FLC	Targets at Other Schools
We currently know the amount of hazardous waste shipped out, but we don't have a baseline measurement for the total amount of these materials on campus at any one time or their HMIS® III rating. We do know that FLC almost always stays below the 2200 pounds of hazardous waste on-site at one time or more than 2660 pounds generated in a twelve month period. This allows FLC to remain a Conditionally Exempt Small Quantity Generator (CESQG) requiring less oversight. From 1993 to 2007 we generated an average of 2148 lbs. of hazardous waste per year or 0.54 lbs. per student.[8] This costs us an average of $4,492/year, though going forward the cost should be less as we did a few one-time cleanouts of radioactive materials that are no longer in-use. The Chemistry department uses micro-scale techniques in order to reduce the amount of hazardous chemicals used in the lab. We know that pesticides used on campus dropped from 75.5 lbs. (~9.44 gallons) in 2006 to 30.17 lbs. (~3.77 gallons) in 2007. This drop is deceptive. This was partially due to the switch to a fertilizer with the herbicide 2-4D so there was less need for spraying. We know that Orkin used 24 gallons (~192 lbs.) of	Very few campuses record the amount of hazardous materials purchased, though many are moving to implement tracking systems and set targets as part of their purchasing protocols. Most track the amount of hazardous waste generated. For large research institutions this will be much larger than for smaller schools like Fort Lewis. Here are some numbers for comparison: • CU-Boulder: 2.58/lbs per student • UC-Berkeley: 5.26/lbs per student • Colorado College: 0.75/lbs per student Southern Oregon uses about 55 gallons of pesticide and herbicide a year. 38% of campuses nationwide have programs encouraging micro-scale chemistry techniques Many campuses have integrated pest management programs for their landscaped areas. A few, including CU-Boulder and CSU, have indoor IPM programs that reportedly save money and are more effective than traditional pest control techniques. In 2004,

[8] This assumes an average enrollment of 4,000 students.

pesticide on campus along with over two tubes of roach gel and 35 grams of poison bait from November 2006 to October 2007 at a cost of $6,560.[9] We also know that 43% of campus buildings have materials containing asbestos.	CU-Boulder used 13.82 pounds of pesticides to cover 10,000,000 square feet of building space. This excludes their greenhouses where they sprayed almost 542 gallons of pesticide in 2004. UCCS and Southern Oregon both contract out for their indoor pest management as we do. The State of California has a very aggressive program to phase out spraying and fogging techniques from schools.

Recommended Low Target	Action Step/Ideas	Possible Responsible Parties	Cost/Resources Needed
Decrease from baseline in lbs. of hazardous materials(rated 2, 3 or 4 according to the HMIS rating system) purchased/student Decrease in lbs. of hazardous waste generated/student Decrease in total volume of pesticide and herbicides used Decrease in volume of synthetic pesticide used indoors/square feet of building space	Campus-wide inventory of hazardous materials that records HMIS rating. Work with EHS, IT, Purchasing, and academic departments to set up a system to track purchases of hazardous materials (WC √) Create a formal IPM policy Research additional IPM strategies and services, especially for indoor areas Inventory privately-acquired pest control products (e.g. Raid) on campus Assess the potential to switch to an indoor integrated pest	**EHS Office**, campus departments, students **Students**, EHS Office, campus departments, IT, purchasing **Students**, PPS **Students**, PPS **Students,** EHS Office, PPS, Student Housing **Students**, EHS Office, Campus Dining, Student Housing	Staff time and possibly some software components. Bruce Mayer in IT has suggested that adjustments to our purchasing software could be done internally. We do not know the cost of alternatives to herbicide and pesticide use. Hand pulling by volunteer crews could help achieve this goal. **Benefit/Payback Period** Using our own data and data from other schools, every pound of hazardous waste costs $2.00 to $2.50 for disposal. A 10% reduction in hazardous waste would save the college $428/year.

[9] Conversions from weight to volume use the water-based standard of 1 pint of liquid to 1 pound of weight

	management system Include language that stipulates non-payment to outside contractors for failure to meet campus-defined best practices (e.g. spraying in high temperatures and winds)	**Purchasing**, PPS	Other schools also report that indoor IPM techniques save money and are more effective than the traditional methods that Orkin uses on our campus.

Rationale

We assume that we can achieve downward trends for each of the indicators listed above without significant cost to the College. There will be cost in setting up systems to monitor and track these variables. We don't know what these costs will be, but setting up the monitoring systems is a minimum step to achieving progress. A downward trend in these variables will result in savings in purchasing and disposal costs that will eventually pay for the set up of the program. There also might be opportunities to partner with the City and County on the disposal of hazardous items. There is a great deal of interest in establishing an indoor integrated pest management system. CU-Boulder and CSU have both had success with these programs, but they require either an outside contractor making regular visits to the campus or training someone on staff to implement a program. The focus of indoor IPM is preventative and so we need to compare the costs of either an outside contractor or training someone on staff with what we currently pay Orkin to spray and bait around campus. CU-Boulder spent an average of 769 hours on their indoor IPM program, but they also report that the program has reduced pest control costs 45%. A similar savings at FLC would be over $3000/year. There are two credits available in the LEED-EB system for such a program. Additional proposed actions that we do not have costs for are listed below.

Other ideas proposed: Track use and disposal of oily rags (WC), post clear guidelines in each lab as to what can and cannot be drain-disposed, provide secondary containment (e.g. Rubbermaid containers) under hazardous waste containers in fume hoods or on lab benches) (WC √), protect waste batteries from the outside elements (WC √), organize volunteer crews to remove weeds by hand, research weed-eating insects for our area, seed in natives into weedy areas, create a campus weed map, improve recordkeeping of pesticide applications (WC), implementation of micro-scale chemistry techniques, ban use of chemicals determined hazardous to human health by the WHO (most chemicals are simply registered through the EPA without evaluation of their true health effects), hold an "amnesty day" for the campus community to turn in their hazardous materials, create and staff a chemical stock room or exchange program, create an on-line chemical inventory, consider charging departments for disposal of hazardous waste, provide grants to departments that reduce waste and hazardous waste, remove carpet from high traffic areas.

3.2 Provide a healthy indoor environment for the FLC community

Potential Indicators	Chosen Indicators
% of $$ spent on green vs. conventional cleaning products % of $$ spent on low-VOC vs. conventional products # of indoor air-quality complaints % of buildings with filters on outside intake systems Frequency of monitoring of air delivery systems Indoor air quality measurements for radon, CO_2, and mold # of departmental representatives to an EHS program # of students engaged in EHS issues and initiatives # of injury and incident reports over time # of ergonomic injury reports over time participant hours for EHS training	% of $$ spent on low-VOC vs. conventional products # of injury and incident reports over time
Rationale The two chosen indicators are the standard ones that other campuses use to measure environmental health. Performance on these indicators will earn credits within the LEED-EB rating system. Many campuses are just trying to set up systems to monitor these.	

Current Situation at FLC	Targets at Other Schools
The Health and Safety Group at Fort Lewis completed an informal institutional self-assessment in 2004 following the lead of the Sate of Colorado Risk Management office. In 2008, the College hired its first full-time Environmental Health and Safety Director, who will address workplace safety and indoor environmental issues. This new office will help coordinate EHS actions work across campus.	CU-Boulder: • integrating IAQ into building and design standards • increase use of no- and low-VOC products • using green cleaning products in all departments University of British Columbia: • decrease frequency of time-loss accidents by 10% each year • creation of targets for health promotion and wellness

The Purchasing Department is taking the lead on the coordinating use of "green" cleaning products. FLC has never measured indoor air quality or tracked IAQ complaints, though there haven't been very many. New buildings seeking LEED certification presumably will address several indoor environmental quality issues through the LEED system.	Colorado State University: • Receives 15-20 air quality complaints per year and has one of the leading IAQ programs in the country • Uses only no- or low-VOC products • Uses green chemical cleaning products UCCS • Increase % of people participating in preventive health services and practices • Use no- or low-VOC products in all new construction and renovation • Campus-wide use of "green cleaning" products

Recommended Target	Action Step	Responsible Parties	Cost/Resources Needed
Campus-wide use of green cleaning products ☼ Use no- or low-VOC products mentioned within current LEED Standards in all new construction and renovation Decrease from baseline in injury and incident reports over time	Complete work on a green-cleaning policy for the College Integrate EHS liaison program into the building-by-building proctor system Develop a mechanism to track injuries and incidents Assess radon levels in campus buildings	**Student Housing,** Purchasing, Sodexho, PPS, Student Life Center **EHS Office**, Departments **EHS Office** **EHS Office** or contractor	Staff time is necessary to set up these monitoring systems and coordinate work and policies across campus. The committee that is working on a green cleaning policy is currently assessing the costs of the policy. Radon kits are under $20 and are portable. The use of no-VOC products in new buildings will almost always be part of achieving the LEED-Silver rating the College

			has committed to. It only costs $1/gallon more for low-VOC paint from FLC's supplier. **Benefit/Payback Period** These actions will all increase productivity and save the college money. Safer cleaning products can increase worker productivity between 0.5 and 5%. It's also an important part of risk management. CSU set up their IAQ program after paying $7 million to remodel their engineering building and dealing with multiple worker compensation claims.

Rationale:

Coordinating the purchase of green cleaning products is already underway through purchasing and should not add significant cost to the FLC's budget. Tracking of injuries is standard procedure and also should not cost additional money. There might be federal money available to set up an indoor air quality program, but there are currently so few complaints that it seems more worthwhile to focus on other things.

We discussed installing 10 feet of entry mats for each main building entrance to comply with LEED-EB standards. Entry mats cost roughly $1800 each. This means that the College would have to choose carefully what buildings to buy them for.

Other ideas proposed: Surveys knowledge level of EHS and wellness issues, educate faculty and staff about EHS requirements and regulations (WC), make sure proper protective gear is available, maximize daylight in renovations (WC √), provide online tutorial for those working with hazardous materials, maintain list serve for those working with hazardous materials, use of low-impact powered cleaning equipment, identify opportunities for classes to take on EHS projects, identify new strategies to enforce rules governing

smoking near the entrances of buildings (25' from entrance), develop an inventory and tracking system for paints, adhesives, office products that off-gas VOC's, set up regular schedule for evaluation of air delivery systems,

3.3 Ensure healthy and safe food products for FLC campus

Potential Indicators	Chosen Indicators
Nutritional assessment of dishes served by campus dining Amount of canned or processed ingredients in dishes % of meat and poultry products that have not been given antibiotics, hormones, or other drugs % of dairy products from cows free of recombinant Bovine Growth Hormone (rBGH) or antibiotics % of seafood that meets the criteria of the Seafood Watch or Salmon Safe program % of budget spent on fresh ingredients Number of meals made from scratch % of food in campus dining screened for safety	Nutritional assessment of available dishes % of food in campus dining screened for safety
Rationale This objective is really about ensuring that healthy food options are accessible to the FLC community and that those choices are safe. We have left educating the campus community about those choices to the Education and Engagement portion of the plan.	

Current Situation at FLC	Targets at Other Schools
Sodexho provides nutrition information for each of its dishes in the dining area and the company's national website provides nutrition information for each of its menu items. The college relies on Sodexho for education about nutrition and food choices.	UC-Berkeley's menu is over 65% vegetarian. Soy and lactose-free milk are provided in every dining common. They are trying to reduce the use of foods using high-fructose corn syrup. UC-Santa Cruz, a national leader in healthy food options, has 36% of their food budget go toward processed foods (dry goods, frozen foods, juice). 75-80% of seafood has been certified by the Seafood Watch program; 100% of liquid dairy products are

	hormone-free

Recommended Target	Action Step	Responsible Parties	Cost/Resources Needed
Continue to have at least one vegetarian and vegan entrée available at every meal ☼ Decrease in baseline for the amount of food using processed and canned ingredients Maintain current "no trans fat" policy ☼ Ensure 100% of food is screened for safety Increase in dishes made from scratch on-site	Identify ways to adapt the menu for vegan students Determine the baseline in the amount of processed and canned ingredients. Study minimum nutritional requirements for every meal Create a food safety committee that would "approve" local vendors who meet certain standards for food safety. Identify substitutions for processed ingredients in menu and the cost implications for substitutions Identify ways to adapt the menu for vegan students	**Students**, Campus Dining **Students**, Campus Dining **Students**, Campus Dining **Environmental Center**, Students, faculty, staff, campus dining **Students**, Campus Dining **Students**, Campus Dining	Staff time and $700 to pay for USDA inspectors for initial visit to assess food safety of selected on and off-campus locations; the proposed food safety committee would follow USDA checklist in working with local vendors. **Benefit/Payback Period** Healthier food choices could lead to increased retention of students and more participation in the meal plan, which would generate revenue for the College.
Rationale Almost all of the food available on campus is screened for safety. The idea for a campus food safety committee would allow food grown on campus or in the local community to become part of the food stream. This idea will come up again in the consumption portion of the plan. While vegetarians and vegan can piece together a meal in the cafeteria their options are restricted. It would be good to continue to develop options, especially for vegan students. *Other ideas discussed*: We do not have cost information on purchasing dairy, meat, poultry, and seafood free of antibiotics and			

chemicals. We do not know how to integrate this into the targets listed above.

Section Title - Consumption

Context & Current Situation

Consumption involves everything we buy, use, and discard. There are three parts to this section of the plan. The first is reducing the amount of material that we purchase through conservation and re-use of items both large and small. The second is reducing the environmental impacts of the materials that we do buy, from electronics to food to bags. The third is what we do with something once we are done with it. Do we throw it away or divert it from the landfill with recycling and composting? There are both upstream and downstream impacts to consider.

A primary challenge running through this section of the plan is our current inability to get accurate measurements of our consumption habits. For example, with regard to purchasing, the current software for the Central Stores system makes it difficult to quantify purchases by type of material. To calculate the amount of money spent through Central Stores on paper, staff had to compile reports on all the individual types of paper people use on campus. Similarly, in terms of waste, Fort Lewis pays per pick-up rather than by volume or weight. This makes it impossible to see if waste reduction and recycling campaigns are having an impact. Any kind of monitoring and estimation requires a great deal of time and effort. This makes it more difficult to participate in national competitions such as Recyclemania that have significantly improved consumption behavior at other institutions. Improving our capacity to track and measure our consumption habits would help enormously with education efforts within the Fort Lewis community. Renegotiating the waste management contract so that we pay by weight would also provide a financial incentive for the college to divert material from the landfill. In 2010, the College switched its contract from Waste Management to the City of Durango. In the future, it should be easier to work with the City than a private company to measure our waste.

It's also important to realize that this entire aspect of operations is also developing at a rapid pace. Green or sustainable purchasing is in its infancy. New demand for "green" products is creating an evolving marketplace. The movement toward integrating local food into campus dining operations is exploding and pushing companies to adapt. As an example, bringing local food into an institutional setting to satisfy demand can push institutions and food service companies to evaluate food safety differently. The tracking of "food miles" and calculating the carbon footprint of food is forcing distributors to trace the "chain of custody" for their food products in new ways. Fort Lewis is confronting these issues in the same way as other institutions: through deliberate discussions, experimentation, and innovation.

Finally, there are technical challenges to dealing with our consumption. For purchasing, the challenges are related to software and organizational management. For waste, the issues involve the evolution of biodegradable and compostable products and the facilities to deal with them.

Strategic Direction: *To serve as a national example for other institutions in terms of re-use, responsible purchasing, and management of our waste.*

Goals & Objectives

The following symbols are included after some of the goals, objectives, indicators, and action steps listed below:

☼ - Part of the campus sustainability rating system from the Association for the Advancement of Sustainability in Higher Education (AASHE). Two stars equal a priority rating point.
WC – Recommendation from the consulting firm of Woodard and Curran; (√ means a "low-hanging fruit;" ◙ means a priority recommendation)

Goal 1: Reduce consumption of new material on campus

Specific Objectives:

- Reduce per capita waste generated ☼☼
- Reduce paper consumption on campus

Goal 2: Reduce the environmental and social impact of the supplies and materials used on campus

Specific Objectives:

- Consistently increase % of purchases that meet sustainability criteria, w/ priority on: energy-efficient products, non-toxic chemicals, minimizing transport miles, reduction in packaging, recyclability, fair labor practices, used materials, products available to individuals on regular basis and are visible (e.g. coffee cups, plastic bags, etc.)
- Minimize purchases of plastic products
- Increase the amount of local, organic, and fair trade food within campus dining (WC ◙, ☼☼)

Goal 3: Increase rates of recycling and composting

Specific Objectives:

- Increase the percentage of the waste stream that's recycled
- Increase percentage of waste stream that's composted ☼
- Increase recycling of e-waste (WC, ☼)

Rationale

These three goals form a progression that can reduce the impact of campus consumption of material and resources. The first goal is meant to reduce the amount of material we purchase. The second goal is to reduce the impact of the material we do purchase through creating a Sustainable or "Green" Purchasing Program. The third goal seeks to increase recycling and composting to avoid sending the waste from the material we use to the landfill.

Note that the names that appear in **bold** are the parties that would have primary responsibility for the listed action item. Other names listed would be involved in the planning or implementation.

Goal 1: Reduce consumption of new material on campus

1.1 Reduce per capita waste generated ☼☼

Potential Indicators	Chosen Indicators
lbs./person of solid waste, recycling, and composting	lbs./person of solid waste, recycling, and composting
Rationale Weight is the standard measurement and there are conversion factors for changing volume into tons. The intent of this objective is reducing consumption and increasing re-use.	

Current Situation at FLC	Targets at Other Schools
This objective is really about our re-use programs that will prevent the purchase of new materials on campus. The Sustainability Assessment allowed Fort Lewis to compare the amount of waste it generates with other institutions that participate in Recyclemania, a national competition in waste reduction, recycling, and composting. The best estimate given the	UCCS – 287 lbs/person/year CU-Boulder – 210 lbs/person/year and target of 20% reduction CSU – 137 lbs/person/year

available data is that Fort Lewis generates 320 lbs./per person during the school year. Most schools during the same period generated between 150 and 450 lbs./person, putting Fort Lewis in the middle of the pack. An estimate of our total waste generated during the year is 719 tons, with 582 tons hauled away for trash. Numbers for our campus are based on spot checks of dumpster volume and recycling bins. We do not pay for trash disposal by ton and the city does not weigh the recyclables when taken from campus. This arrangement seriously hinders waste reduction efforts because there are no direct savings from reducing waste or concrete data to use in education campaigns.	Evergreen – Set a goal to be a zero-waste campus by 2020 Warren Wilson College – 840/lbs/person/year. The high total for Warren Wilson might be due to a more comprehensive measuring protocol. "Free stores" exist at CSU, UC-Berkeley, UVA, University of Oregon, Warren Wilson College, and Evergreen State College Many campuses have "move out" programs to reduce waste.

Recommended Target	Actions to Achieve Target	Responsible Parties	Cost/Resources Needed
In five years, Have a consistent year-by-year per capita reduction in the amount of waste generated by the college	Incorporate waste reduction in vendor contracts Create a materials exchange or "free store" with an online catalog for drop-off of small items (WC, ☼) Maximize use of existing online exchange tools such as Freecycle Provide increased marketing and promotion for surplus property storage and sales Create move-in and move-out program in conjunction with materials exchange program	**Purchasing** **Environmental Center** **Environmental Center** **Purchasing** and Environmental Center Residential Life, **Environmental Center**, Physical Plant Services	Total cost for these actions would be roughly $2800/year and an additional $1500 for promotional materials that would need to be re-done every few years. At University of Oregon, they operate a re-usable office supply program for an equivalent of $1920/year for student labor. Estimated costs for move-in and move-out program are $200-$300/year for work-study students to inventory and transport materials to a pick-up or storage location and $500 to

	and local thrift stores (e.g. rescue reusable cardboard boxes for use at end of year)		create promotional material. We would recommend funding the departmental rewards program at $500/year for the top three finishers. A food waste education program cost roughly $500-$1000 for promotional materials Food service initiatives would save our provider money or be cost neutral over time.
	Do departmental waste audits and provide small rewards to departments that generate the least waste	**Environmental Center**	
	Establish partnerships to divert re-usable items to community groups (e.g. building fixtures to Habitat for Humanity)	**Environmental Center**	
	Promote use of online resources, such as Moodle, to reduce paper use	**IT** and Environmental Center	**Benefit/Payback Period** Almost all of these measures would actually save the College money by reducing purchasing and disposal costs. Sales of surplus items can generate money for the College. For example, we pay over $2000 for five extra roll-off dumpsters during move-out. Using current costs and waste stats from the FY2006, **if we paid for trash hauling by weight** it would cost us roughly $102/ton. To generate the $4300 necessary to pay for the
	Create an education program to reduce food waste	Campus Dining and **Environmental Center**	
	Expand re-usable incentive program in campus dining to include utensils, dishes and Tupperware (WC, ☼)	**Campus Dining** and Environmental Center	
	Work with campus dining to reduce waste associated with events held at the College	**Environmental Center**, Campus Dining	

			action steps **under such a contract** we would need to reduce the waste going to the landfill by 42 tons. Meeting the target (38% reduction) would, with the same recycling and composting rate, save us $22,245 a year **under weight-based contract.**

Rationale

We do not have a good estimate of the impact of the action steps listed above on the total amount of waste generated by the College community. For this reason, PACEA recommended shifting from a hard reduction target to annual decrease. We know, however, from waste/per capita figures at other schools, 200 lbs/person should be achievable. We are not sure how to reconcile this information in setting a target, which is roughly a 38% reduction below our current level.

Based on his experience, Ted Gross, who is in charge of waste for FLC, believes the greatest waste is generated by events on campus and during move-in and move-out. Focusing on large items during move-out provides the greatest potential for savings and for bringing down our overall pounds per person. For events, the 2009 Convocation Picnic generated 228 pounds of trash in 1 ½ hours. In terms of our everyday waste stream, the sustainability assessment suggested that reducing waste associated with paper, cardboard, food, and paperboard would have the greatest impact.

Most schools, however, do not explicitly measure the impact of these initiatives on their campus and so there is scant data for comparison. Data from Tufts, University of Richmond, UVM and Colorado State suggest that waste reduced from a comprehensive move-out program would be between 2 or 3 tons at Fort Lewis. Based on numbers from CSU a move-in program to capture cardboard would take a couple of tons from our waste total. UC-Berkeley believes their "office free store" program can remove roughly 1 lb./per person/year from their waste stream. Using these rates, the exchange program would capture 2.5 tons at FLC. Warren Wilson estimates it captures between 1.4 and 2.9 tons of reusables each year.

Other ideas: Replace common non-recyclable items with more durable or recyclable options (WC), explore creating a furniture repair program (WC), use bulk condiment dispensers in campus dining ☼, create a chemical stock room to facilitate reuse of chemicals ☼, reduce vending machines on campus, promote a craft program made from discarded items, promote the use of clipboard and paper,

and re-usable envelopes.

1.2 Reduce paper consumption on campus

Potential Indicators	Chosen Indicators
Lbs/person/year of paper Dollars spent	Lbs/person/year of paper
Rationale A per capita reduction is probably most appropriate measure to track over time.	

Current Situation at FLC	Targets at Other Schools
FLC does very well in comparison to other campuses in terms of paper consumption. We spent $40,405 on office paper last year. 93% of this is on standard white copy paper. This averages out to about 13 lbs/person/year. The campus' current pay-to-print program has likely helped to reduce the amount of paper significantly. UCCS that lacks such a program uses 47 lbs/per person/year.	UCCS – Their goal is to reduce paper consumption by 30% over five years. UBC – Between 1999 and 2007, they were able to reduce paper use from 23 lbs/person/year to 16.4 lbs/person/year. Evergreen – Uses almost the same amount of overall paper that we do and has declared its intention to reduce paper consumption by another 50%. UCSB – Uses about 15/lbs/person/year

Recommended Target	Actions to Achieve Target	Responsible Parties	Cost/Resources Needed
Decrease in paper use per capita (same as objective)	Evaluate the effectiveness of "pay-to-print" program ☼ Maximize effectiveness of "printing" protocols on campus	Librarians, Computer Lab Technicians, **Students** Librarians, Computer Lab Technicians, **Students**	Minimal cost associated with better signs about paper conservation

	(e.g. set printers to double side printing) Increase use of online materials through Moodle or other online tools ☼ Campus-wide education about paper conservation More uniform use of scratch paper for printing across campus	 **All departments** Orientation leaders, **students** making signs **All departments**	**Benefit/Payback Period** If every person reduced their paper consumption by a pound, the college would save $3,108 at 2006-07 prices for paper.
Rationale: The Governor's Greening Government Executive Order mandates a 20% reduction in paper use. This target is likely attainable through the actions listed above. But since Fort Lewis is already doing well with paper use, achieving a 20% reduction will be challenging. Online and electronic resources for filing are not fully deployed or utilized. This should be a focus of reduction efforts. *Other ideas:* Set up an experimental "paperless" office on campus, experiment with e-textbooks			

Goal 2: Reduce the environmental and social impact of the supplies and materials used on campus

2.1 Consistently increase % of purchases meeting sustainability criteria, w/ priority on:

- Energy-efficient products
- Non-toxic chemicals
- Minimizing transport miles
- Reduction in packaging
- Recyclability
- Fair Labor Practices
- Used materials
- Products available to individuals on regular basis and are visible (e.g. coffee cups, plastic bags, etc.)

Potential Indicators	Chosen Indicators
Sustainability index (to be created) • % of purchasing decisions • % of expenditures Product specific indicators such as Energy Star™, EPEAT, Green Seal™, Forest Stewardship Council, 100% PCW, chlorine-free paper, etc. % of vendors participating in our Sustainable Purchasing Program % of expenditures covered by vendors participating in our Green Purchasing Program	Sustainability index (to be created) • % of purchasing decisions • % of expenditures Product specific indicators such as Energy Star™, EPEAT, Green Seal™, Forest Stewardship Council, 100% PCW, chlorine-free paper, etc. % of vendors participating in our Sustainable Purchasing Program % of expenditures covered by vendors participating in our Green Purchasing Program
Rationale It makes sense to measure our progress on sustainable purchasing by looking at our overall purchasing practices and by looking at specific types of products. We currently lack the means to effectively and efficiently track purchasing information. Setting up these systems will take several years, but it is what all colleges and universities working on sustainable purchasing are moving toward. Many colleges are negotiating contracts with major suppliers that require them to provide information to the college. Other colleges (UC Santa Cruz and CSU) and government agencies are developing specially designed web portals that allow online shopping from a specific selection of sustainable products. Setting up these types of systems is listed as an action item below.	

Current Situation at FLC	Targets at Other Schools
As part of the President's Climate Commitment, FLC has adopted a policy to purchase only energy-efficient products where ratings such as Energy Star™ exist and they are available at a reasonable cost. We also currently purchased 100% post-consumer recycled paper for all regular office paper; colored paper is 30% recycled	61% schools report they have programs to encourage environmentally sound purchasing 36% purchase office paper with a minimum of 25% post-consumer waste; 10% purchase paper that is chlorine-free Many campuses simply have creating an Environmental Purchasing Policy as their objective. These policies usually state intent and do not set specific goals for different types of products.

content. Many other "green schools" do not yet purchase 100% recycled paper, making us a leader in this area. By purchasing 100% recycled paper by the truckload we are able to save 15% off the cost. Student Housing is taking the lead on the coordinating use of "green" cleaning products.	Most are developing data tracking systems so they can get baseline measurements that will allow them to set more specific goals. Duke, Rutgers, and Yale have leading programs. Duke has a green purchasing officer.

Recommended Low Targets	Actions to Achieve Target	Responsible Parties	Cost/Resources Needed
In five years Increase from baseline overall % of purchases through Central Stores of sustainable products Draft a sustainable purchasing policy and set a target for vendor compliance. (WC) 100% of purchases will comply with Energy Star™ or other energy efficiency rating where available and the product is within an acceptable cost range (WC, ☼☼) All office paper will be at least 30% recycled. General use office and copy paper will be 100% recycled when within a 15% cost	Work with IT to integrate tracking of green purchases into Banner 8 (WC) Communicate to campus about energy-efficiency purchasing policy from the PCC Research the amount of purchases made through different paths (P-card, bookstore, IT, personal purchases, POs, contracting) Identify the front-line staff across campus for purchasing decisions. Explore the feasibility of a web-based system for campus purchasing that allows advertising green options and tracking of green purchases	**Students**, IT, and Purchasing **Purchasing** Purchasing, **Students** **Students**, Purchasing **Students**, Purchasing, IT	There are no direct financial costs to achieve these targets. Staff time will be necessary, but students can do the bulk of the research on products. Students can also draft a recommended purchasing policy, reducing necessary staff time. We anticipate additional green products will be coming onto the market, reducing the cost differential between these and conventional products **Benefit/Payback Period** In most cases, there is no direct financial payback for sustainable purchasing. Sustainable purchasing can be a very visible way to indicate

differential of 30% paper. (WC)☼☼ Campus-wide use of green cleaning products ☼ Development a long-term strategy to increase sustainable purchasing by the overall campus			FLC's commitment to sustainability. Purchasing green custodial products reduces health risks and can improve productivity Improved tracking of purchasing information will help the campus make the most of its resources
Rationale Green or "sustainable" purchasing is in its infancy at colleges and universities. The specific targets for paper, energy efficient equipment, and green cleaning products are initiatives that are already in place that need more formal support to succeed. Further progress will require setting up tracking systems for both overall purchasing and "sustainable" purchasing. This will be possible for Central Stores with the new Banner 8 system. Students can play a leading role in researching the burgeoning green products sector and helping to rate products in the Stores catalog. There are, however, many other types of purchasing on campus besides Central Stores, such as P-card, bookstore orders, Purchase Orders/Requisition Items, and Contracting. FLC needs to develop a long-term strategy to capture information about these sources of purchasing and develop a way to increase the % of expenditures on sustainable products. Part of this strategy could include implementing a campus-wide Sustainable Purchasing Policy, which was one of Woodard and Curran's primary recommendations. This policy could define acceptable cost differentials for the campus to switch to a greener product. Because of the unknowns involved in such a campus-wide program, we have not offered a higher target. There were numerous specific ideas for improving our purchasing practices which are included in the appendix of this section.			

2.2 Reduce the purchase of plastic products

Potential Indicators	Chosen Indicators
$$ spent on plastic bags/student $$ spent on bottled water	$$ spent on plastic bags/student $$ spent on bottled water
Rationale	

Focusing in on plastic bags would be relatively easy (though there are many types of plastic bags) and it is possible to cull records from catering and vending machine companies for purchases of bottled water. Research on the percentage of plastics purchases accounted for by bags and bottled water would be important as well. How to rate the environmental impact of various plastic products, including biodegradable plastics, would provide a good class project.

Current Situation at FLC	Targets at Other Schools
When the bookstore was part of the College it was compiling information on the number and cost of plastic bags ordered each year. We do know that the Admissions Office uses 2,500 to 5,000 bags for events and tours. For 2010, the admissions office is switching to a reusable bag for prospective students. The old bookstore used three other types of plastic bags. These were all made from recycled material. They also provided bags for various athletic events and on-campus conferences. In 2009, they started selling a re-usable bag with the Fort Lewis logo. These bags cost $1.25 and retailed for $2.95. They also had a re-use bin for students to drop their bags when they leave the bookstore. We do not know how many of these initiatives will continue with the new bookstore contract. Central Stores orders two types of plastic bags -- large ones are 1.7 mm in thickness and hold 22.9 lbs. and cost $24.00 for 100; small ones come in a case of 500 for $15.00. More lines of compostable bags are coming on the market. This would make a useful pilot project. In terms of plastic bottles, we know that the Hungry Hawk Snack Bar and catering goes through about 12,000 bottles of water during the school year. Incoming students on meal plan receive a re-usable mug from	CU-Boulder – Gave away a re-usable nylon bag to 500 first-year students in their Grab n' Go dining locations as a pilot program University of Singapore – began charging $0.10/bag and saw bag use drop 90% Dickinson College – Students can purchase a reusable cotton bag with a sustainability message at their Grab n' Go snack locations for $3 Emory University – Students get 50% discount at Starbucks when they use their re-usable mug. Evergreen State College – Held a "Ban the Bottle" campaign to draw attention to the impacts of plastic bottles and received a grant to reduce the price of stainless steel water bottles.

campus dining. They receive a 50 cent discount when they use the mug at retail dining locations. The mug costs $1.28 each and retails for $3.49 with the first drink free.	

Recommended Low Target	Actions to Achieve Target	Responsible Parties	Cost/Resources Needed
In five years: Eliminate the use of: • plastic bags in the bookstore and other campus retail outlets • plastic bags for admissions events and campus tours. Reduce the sale of: • plastic bottles in campus vending machines • bottled water at retail locations on campus.	Provide FLC re-usable bags for incoming students during orientation Find a more sustainable option to the plastic bags handed out to visitors during tours and admission. Pilot use of thinner plastic bags to reduce the total amount of plastic purchased Pilot the use of compostable trash liners. Create a broader re-usable drinking container program that will reduce the desire for bottled water Negotiate vending contracts without plastic bottles. Work with catering to experiment with water coolers, pitchers, and compostable paper cups to use in the place	Bookstore, **Students** Bookstore, Students, **Admissions** **Custodial staff in SUB**, Students **Grounds staff**, Campus Dining, Students **Students**, Campus Dining **Administration** Catering, **Students**	Using CU-Boulder's program as a model, a pilot program that gives away re-usable nylon bags to first-year students would cost $2600/year. We believe providing an FLC water bottle to incoming students would cost roughly $5000/year, which is about four times as much as the FLC mug. The plastic bags for admissions are about $0.08 each. Pocket folders are ten cents each. We do not know the financial impact of restricting Coca-Cola to aluminum cans in vending machines. **Benefit/Payback Period** We believe the costs for a re-usable bag and bottle program can be offset by a per bottle and per bag fee for purchases of bottled drinks and disposable bags at campus retail locations

	of bottled water for large campus events Inventory opportunities to eliminate plastic products from campus Research the impacts of different types of plastic products Create customized FLC bottles and bags from salvaged material given to the "free exchange store" (see waste reduction objective below)	 **Students** **Students** **Students**	and through catering. But this will require more study to get the financing right. Packaging the financing for a bag and bottle initiative together might make both more cost effective. Phasing out the use of plastic bags will save the bookstore money, and reducing plastic bottles and bags would reduce our waste totals and save time for the recycling staff.
Rationale Between 500 billion and 1 trillion plastic bags are used every year on our planet. Durango Natural Foods charges for bags and we can learn from their experience in how to create a successful re-usable bag program on campus. CU-Boulder found that purchase of re-usable bags for first-year students would cost $1800 less than the plastic bag budget for their Grab n' Go facilities. Bags serve a marketing function for the bookstore and reusable bags could market sustainability at Fort Lewis. Plastic bottles can only be recycled once, whereas aluminum and glass can be perpetually recycled without degrading. Tests have shown that bottled water is typically no safer than tap water. Bottled water is also part of a growing trend toward privatization of water supplies that has sparked large protests in developing countries. This is a very visible change that will make a strong statement about the campus commitment to sustainability. While we are confident that aluminum and glass has less impact than plastic in its disposal, we need to do more research on impacts of production for various types of containers.			

2.3 Increase the amount of local, organic, and fair trade food within campus dining (WC ◙, ☼☼)

Potential Indicators	Chosen Indicators

% of food purchases from local sources % of total food purchases that are certified organic % of total food purchases that are certified fair-trade % of total food purchases that are Food Alliance certified ☼☼ # and frequency of dishes available made with local, organic, or fair-trade ingredients % requirements for specific ingredients (e.g. beef, poultry, lamb, pork, flour, milk, eggs, produce, etc.) Reduction in food miles for top 15 items used in campus dining	% of food purchases from local sources % of total food purchases that are certified organic % of total food purchases that are certified fair-trade # and frequency of dishes available made with local, organic, or fair-trade ingredients

Rationale

Most schools calculate a percentage of total food purchases that are local or organic. These percentages are often only 5 to 10%. These percentage targets are useful for comparison to other schools, but participants in the food study circle felt that looking at number and frequency of dishes available made entirely from locally-grown and/or organic ingredients would provide a platform for educating people about the food system and spur creative collaboration between students and campus dining. In the process of trying to meet this target, students and campus dining staff would become much more knowledgeable about what food is available when. This would also help develop relationships with local producers who could rely on requests for a certain volume of a certain ingredient at a certain time of year.

Without knowing the precise availability for specific local food items it doesn't seem prudent to set targets for specific types of food such as meat, milk, and eggs – though beginning to track this information would be useful. Similarly, the standards for measuring food miles are still being worked out and at this time would be problematic as an indicator.

Current Situation at FLC	Targets at Other Schools
In fall of 2007, Sodexho at FLC spent 1.24% of its budget on local and organic food products (0.66% on organic and 0.54% on James Ranch products). This was all in the retail locations. In 2008, Sodexho started to prepare special dishes in the River Rock Café with James Ranch products.	70% of schools devote at least a portion of their budget to local or organic food. 64% of schools offer fair-trade coffee 39% of schools receive milk from a local dairy Campus dining provider Bon Appetit has an Eat Local Challenge

A sample of one month's purchases of the top 15 products used by Sodexho showed that the average distance that ingredients traveled was 1,250 miles. This is slightly below the oft-quoted national average of 1,500 miles. Fair-trade coffee and tea is available at Jazzman's and in the Hungry Hawk Snack Bar and all the coffee is Rainforest Alliance certified. Sodexho at FLC uses Meadow Gold as its dairy supplier; Meadow Gold gets milk from throughout the Intermountain West. Sodexho currently requires $5 million insurance policy on meat and produce and annual certification inspections that cost between $700-$1500 for the farmer or grocery store. Approximately ¼ acre of land on campus produces food, with additional garden areas in production over the summer at the Old Fort. None of this produce is used in campus dining because the garden does not have Sodexho food safety certifications.	where for one day they challenge their chefs at schools around the country make meals exclusively from ingredients provided in a 150-mile radius. *Specific schools:* • Bowdoin College – 25% of food from Maine; target of 30% • Evergreen State – 32% local and organic 40% by 2010 • UC-Santa Cruz – 25% of produce is certified organic • Warren Wilson College – Campus farm and greenhouse provides Sodexho with food for campus dining • Colorado College – Bon Appetit purchases produce from school garden • UCCS – In five years, 5-10% local and 5-10% organic • CU-Boulder – has a Grab n' Go station with only sustainable or natural products • CSU – has a "green restaurant" that purchases local and organic food. • Green Mountain College – holds Local Harvest day where breakfast, lunch, and dinner are made from 90% local ingredients

Recommended Low Target	Actions to Achieve Target	Responsible Parties	Cost/Resources Needed
In five years: One prepared dish/week from all local ingredients (average) One prepared dish/semester from ingredients grown on campus 10% of food budget is spent on local ingredients	Define what counts as "local food" Increase purchase Fair Trade Coffee and tea ☼☼ Research availability of local food by season and amount and identify potential dishes to make from local ingredients	**Students**, Faculty **Campus dining** **Students**, Campus Dining	The overall cost to the college for this target would be an initial investment of $10 to $12,000. An annual cost of $5000 would be needed for maintenance of food production areas over the summer. Setting up a food safety committee is a risk management decision for the

10% of food budget is spent on organic ingredients 80% of coffee and tea on campus is fair-trade certified	Organize the salad bar so local and organic ingredients are separate from the rest of the ingredients. This will change with the seasons. Conduct an additional campus dining survey on student willingness to pay more for local, organic, and fair trade ingredients. Create a local food committee that would "approve" vendors who met certain standards for food safety so they can sell products to our campus dining provider Work with catering to develop seasonal "sustainable and local food" options on the catering menu Explore potential to partner with a local farmer to produce food on the Old Fort property. Dedicate an additional ¾ acre on campus to food production Investigate ways for students to support local food purchasing	**Students**, Campus Dining **Students** **Environmental Center**, students, faculty, campus dining, administration **Students**, Campus Dining **Administration,** Old Fort Task Force **Students**, PPS **Students**	College. We recommend spending roughly $700 for USDA inspectors to visit FLC and Durango. Committee members could shadow these inspectors and use this experience to develop protocols for further operation. The cost of dedicating an additional ¾ acre on campus to food production with appropriate fencing and drip irrigation would be $10,000-$12,000, as a 6' high woven wire fence costs roughly $15/linear foot. Making a portion of the additional acreage into a community garden would reduce the cost of management and maintenance of this space. Currently the Environmental Center has two students managing its summer garden program. These positions are grant funded will last two more summers. Hiring one or two students to manage the garden and orchard spaces is essential to meet the target for food grown on campus.

	to cover additional costs of local food program (e.g. "Local Food" Card connected to a local food fund) Investigate purchasing fair-trade coffee from the Community Agroecology Network (CAN) that provides a greater return to farmers than regular fair trade coffee. Research what it would take to convert the Café a la Carte or the Night Hawk into a sustainable food station	 **Students** **Students**	Additional costs for local, organic, and fair trade purchasing will be passed onto to consumers through our campus dining provider. There is no difference in the retail price between fair trade and regular coffee in the Hungry Hawk, though it does cost Sodexho more to purchase fair trade and we are collecting these figures. **Benefit/Payback Period** To the extent that having more local and organic food options on the menu attracts students to the meal plan, this switch could raise money for the College

Rationale

We believe that food safety is important. We believe, however, that we can assure food safety without reliance on onerous insurance requirements and third-party certification that are beyond the means of most local producers and grocery stores. Bon Appetit requires a $1 million dollar insurance policy; they require a third-party certification but are discussing revisions to their policies. Currently 9-R school district is accepting food from local producers without these requirements. Using Sunnyside Meats USDA-approved processing to purchase meat is one opportunity. Unfortunately, Sunnyside does not currently have the necessary certifications to sell to Sodexho.

In addition to food safety, cost of local food is also an issue. Hamburger patties from Cargil in Milwaukee accounted for 12.8% of the 15-product sample we evaluated during the Sustainability Assessment. Switching this to a local provider through Sunnyside meats could put the 10% target within our grasp. Currently, Sunnyside burger patties are 54% more expensive per pound than the Cargil patties.

An EC survey of roughly 250 students in fall of 2006 showed a clear preference for healthier, more nutritional choices in addition to local and organic food options. 66% of students said they would be willing to pay 1-10% more for a meal plan that included more local options. 17% were willing to pay between 11% and 50% more. The percentages of students willing to pay more for organic food were similar.

If the College allows local vendors to sell to our campus dining provider, there are still unanswered questions related to availability and the capacity to coordinate deliveries from different producers. Going through intermediaries such as Sunnyside Meats or Durango Natural Foods would allow for smoother coordination between our campus dining provider and suppliers.

Other ideas: Research what it will take to get organic certification for EC garden, begin collecting and harvesting wild edibles grown on campus

Goal 3: Increase rates of recycling and composting

3.1 Increase the % of waste stream that's recycled

Potential Indicators	Chosen Indicators
% of waste stream that's recycled Lbs/person/recycled overall and by material % of construction waste that's recycled	% of waste stream that's recycled Lbs/person/recycled overall and by material % of construction waste that's recycled

Rationale

The pilot AASHE rating system uses landfill diversion rate. The Recyclemania competition uses this as well as pounds/per person of recycled material, though this could simply indicate an increase in consumption.

The percentage of construction waste recycled allows for the fact that some years there is a great deal of construction while other years, there is hardly any. The percentage is the measure used by the LEED system to certify green buildings.

Current Situation at FLC	Targets at Other Schools

The data tracking system we have is based on volume estimates for the barrels as they are picked up on campus. This system works fairly well, though it doesn't give us a precise weight of different materials. A truck scale would help but it would have to account for the community's use of our drop-off location. FLC has started to recycle its construction material with the new construction projects. The current target for the new student union project is 50%. Since the Sustainability Assessment last year, PPS has started a recycling bin for scrap metal and other large items. The Environmental Center's analysis of FLC's waste stream in the fall of 2007 revealed that FLC's current diversion rate for recycling is 18% with another 14% that could be diverted from the landfill if there was 100% compliance with the current system. The average diversion rate for colleges and universities is 26%. We recycle 53 lbs/person/year, which compares favorably with other schools. Our low diversion rate, however, indicates we are generating more waste.	22% recycle and compost more than 30% of their waste stream 9% recycle and compost more than 60% of their waste stream Recycling diversion rates Evergreen College – 35% Warren Wilson College – 27%; 225 lbs/person/year CU-Boulder – 29%; 60 lbs./person/year UCCS – 5%; five-year target of 26% CSU – 41%; 56 lbs./person/year UC-Berkeley – 33%; has set a 50% target Middlebury – 38%; 178 lbs./person/year Northern Arizona University - 90 lbs./person/year Construction Waste UCCS – Goal: 75% of construction waste on new projects Emory – Recycles 75% of construction waste on new projects

Recommended Low Target	Actions to Achieve Target	Responsible Parties	Cost/Resources Needed
In five years: 35% of our waste stream will be recycled 50% of construction waste is recycled as part of all new projects	Provide recycling bins at campus events (WC √) Increase ease/accessibility through # and placement of recycling and trash bins in and	**Environmental Center**, Facilities Scheduling, PPS, Catering, Athletics **Students**, PPS	The estimated cost of the recycling program at FLC is $35,194/year. Each outside, metal recycling bin cost $1000. The action steps listed to the left would cost a minimum of $2000.

	around buildings Install weather-proof signs with more consistent messaging on the outside collection bins (WC √) Provide residential students with blue recycling bins for their room, suite or hall (WC √) Recruit campus departments/offices taking care of in-building recycling Research ways to recycle paperboard and waxed paper (e.g. coffee cups) Drop-off center back on campus for batteries (WC) Continue Refuse Waste Recycling Program (WC ◙, ☼☼)	**Students**, PPS Housing, **Environmental Center** Faculty, **Environmental Center** **Environmental Center** **Environmental Center** **PPS**	$120 - bins for indoor events $480 – totes for outdoor events $1000 – bins for pilot program in res halls $400 – stickers and signs for existing recycling bins. Student housing has suggested that if the College could find money for small blue recycling cans for all of the rooms ($5,500) that housing could pick up the cost of replacement over time. Additional outdoor or indoor bins could add another $2000-$4000. **Benefit/Payback Period** Recycling prevents the need for larger dumpsters and more frequent pick-up. This lowers the cost of our waste hauling contract. But it does not have a direct payback because we do not pay for trash hauling by weight, and the city receives all the revenue from the sale of the recyclables. Using current costs and waste stats from the FY2006, **if we**

			paid for trash hauling by weight, our current 18% recycling rate would save the college $13,200 in lower trash fees. Boosting this to 35% would save the college an additional $12,468. Achieving the 50-60% diversion rate of the leading recycling schools would completely offset the cost of the current recycling program. To generate the $2000 necessary to pay for the listed action steps, **under such a contract** we would need to increase recycling by 3%

Rationale

Analysis of the waste stream shows that currently if we had 100% compliance with recycling would be at a 32% diversion rates. Beyond the Student Union, the dumpsters used for this analysis were not the ones that typically host catered events. This suggests that the 100% compliance rate would boost our diversion rate higher as we know that catered events generate a large number of recyclables. If we can reduce our overall waste (Objective 1.1), our recycling rate will increase as well.

The bins outside buildings need to be more visible. Some are hidden and not easily accessible. They are all tan with blue lettering in order to blend in to campus. This is an aesthetic decision for the college. For campus events, the students at the Environmental Center have been looking for funding to purchase recycling bins on wheels that staff could roll out for athletic events, central campus events such as the Convocation Picnic, and special events in the Student Union. If these bins such as these had a home in various locations around campus, a work-study student could go around and empty them into the outside metal bins for pickup. This could be something they pursue through the new Sustainability Initiative Fee.

Other ideas: Have fewer garbage cans on campus/or different distribution/placement, include recycling in introductory remarks for conferences and special events (WC √), consider switching to either a single- or dual-stream recycling system with student staff (WC), increase recyclability of products purchased by FLC, have people write their names on recycled items and if their item is drawn they will a prize, have a "get caught green-handed" recycling prize program

3.2 Increase percentage of waste stream that's composted ☼

Potential Indicators	Chosen Indicators
$$ spent on compostable material % of compostable material that ends up compost % of waste stream that's composted Lbs./Person/Year	% of compostable material that ends up compost $$ spent on compostable material % of waste stream that's composted Lbs./Person/Year
Rationale The real measure of a successful composting program is the percentage of compostable food waste and other material that ends up going through the composting process. The other measures are indicators that the compostable waste stream itself is expanding. A high number of pounds of material composted each year could indicate that people are being wasteful with food and so this measure takes some interpretation.	

Current Situation at FLC	Targets at Other Schools
The trash audit from the fall of 2007 showed that 15% of the College's waste stream is compostable using the current Earth Tub system. Because we are only composting food waste from the River Rock Café, we are currently only diverting 1% of waste stream with composting or 2.4 lbs. of food waste per person each year. A trash audit of the SUB dumpster last year indicated that we were only capturing ¼ of the compostable food waste from the CUB. In 2008, the College started processing potato starch food trays	50% of campuses have composting programs Composting Rates: CU-Boulder – 7 lbs/person/year; 3.3% of waste Colorado College – 7.96 lbs/person/year Portland State University –9 lbs./person/year; 4.1% of waste University of Washington – 10.37 lbs/person/year; Pacific University – 19.07 lbs/person/year Stanford University – 45 lbs/person/year; 7.8% of waste Warren Wilson College – 93.32 lbs./person/year; 11.4% of waste Middlebury – 184 lbs/person/year; 38.7% of waste

from the Hungry Hawk Snack Bar and this increased our composting volumes. Our current system, however, cannot quickly process large volumes of compostable dishware, for example generated by large events or conferences. This limits our ability to capitalize on the growing trend to this material.	Evergreen State College – has gone to completely disposable dishware in campus dining University of Washington has instituted a campus-wide compost collection system. Students have also organized collection of compost on each floor of a resident hall on their campus. Campuses with large composting programs often have off-campus locations or facilities to take their compost.

Recommended Low Target	Actions to Achieve Target	Responsible Parties	Cost/Resources Needed
In five years: 10% of the Fort Lewis College waste stream is composted 75% of the compostable material on campus is composted	Installation of pulper and improved composting measurement in new dining facilities Improve training and accountability of campus dining staff for emptying food waste into composter Integrate compost collection into catering service Get a composting system (e.g. GreenDrum) that doesn't require separation of food and that processes food waste more quickly Run composting program for summer groups	**Contractor** **Campus dining** **Campus dining**, Environmental Center Administration, **Environmental Center** **Campus Dining**, Environmental Center	It costs the Environmental Center approximately $100/year to get wood shavings and create promotional material for the compost program. Not including the Green Drum composter, the total cost for the other action items is about $2000 $750 -$1200 – 10 worm compost bins or solar cones $600 – compost bins for catering events $200 - compostable bags The GreenDrum composter requires an up front investment of $25,000 and $3,000 to $4,000/year to hire a student over the summer to run a

	Increase use of compostable dishware, especially for summer conferencing groups Install solar cone units at strategic points around campus Pilot compost program for campus apartments with movable toters, worm boxes, or solar cones Compost landscape waste, especially fallen fruit ☼ Research municipal composting systems for the City	**Campus dining** **Environmental Center**, PPS **Environmental Center**, Student Housing **Physical Plant** **Environmental Center**	summer compost program. This could be the same student hired to run the summer garden program, reducing the overall cost to the College An increase in the use of compostable dishware would be absorbed by campus dining and passed on within the meal plan and conferencing costs. **Benefit/Payback Period** A load of compost from the Earth Tub has a value of $300-$400 and reduces the cost of fertilizers for the college. Currently we are averaging two-three loads per year, though with additional collection this would likely double. If compost tea became an effective fertilizer this could save additional money each year.

			With such a continuous feed composting system, such as the GreenDrum, it might be possible to do away with chemical fertilizers and save as much as $4,000/year, which could support a student over the summer to help with composting for the summer conference groups. Assuming the GreenDrum system would work for our campus, this would be a 5-6 year payback.

Rationale

The dining facilities in the new union building should result in increased composting. The set up will not rely on students to compost their scraps (except in the new Rocket grille). This will dramatically increase the percent of the waste stream that's composted. The problem is that the plan is for all food scraps to go into the pulper. The current Earth Tub system cannot take large amounts of meat, dairy, and fatty breads that would be part of pulped mix. This creates the potential for the composter to smell and prompted the Environmental Center and the College to explore moving to a GreenDrum system.

The GreenDrum system used at Warren Wilson can process material in three to five days and is a continuous feed system. This system, however, requires a large, consistent supply of wood chips to separate the food scraps and get enough oxygen in the system. The Environmental Center will be investigating how to arrange for storage and delivery of a high volume of wood chips. During discussions about the design of the loading dock for the new Student Union, the College decided that if it were to purchase the GreenDrum it would need to be at another location on campus because it is too large. Physical Plant has identified an area near the Environmental Center greenhouse and students have drawn up a proposal for installation. The material from the pulper would need to be carried in a golf cart to this location once it fills up. We anticipate that compostable disposable dishware will become more cost competitive in the future, but we currently don't have the capacity to handle such a large amount of disposables in the composter. The summer groups especially would overwhelm our system. As a continuous feed system, the GreenDrum would be able to handle this problem.

Another solution would be if the City began a municipal composting program. This would mean the College could take its

compostable material off-site though there would likely be a fee for composting and the College would lose the benefit of turning its food waste into fertilizer.

Another idea discussed is the use of solar cones around campus. These are special units designed to allow processing of small amounts of food waste outdoors. They are sturdier and work better with wildlife than backyard composters. They are likely the perfect size for staff and faculty who have food scraps from their lunch or dinner. Worm composters are another option, but require more care. The five percent target will also become more attainable if we are successful in reducing the overall waste stream through programs focused on re-use (Objective 1.1)

3.3 Increase E-Waste Recycling (WC, ☼)

Potential Indicators	Chosen Indicators
Volume of e-waste collected Lbs. of e-waste collected # of devices collected	Lbs. of e-waste collected # of devices collected
Rationale Volume is less important than lbs. The number of devices collected would be a good sign of growth in the program.	

Current Situation at FLC	Targets at Other Schools
For college-generated e-waste: All of the PCs and laptops are sold after 3 years of life to students. Monitors are sold along with the PCs. Servers are used until they are no longer powerful enough and then will also be sold as used equipment. Any excess, along with broken equipment, goes to Juniper Valley Correctional Facility. In the interim, e-waste is currently stored in Reed Library 41. There is	We did not find schools with specific targets with regard to e-waste, but we did find schools that were trying to make e-waste collection more prevalent on campus The University of Washington has "e-media" bins around campus for small electronics. Several schools in California have set themselves up to collect e-

no mechanism to track the amount of e-waste generated by the school. *For student-generated e-waste:* It is likely that most students throw away their e-waste during move out. This means that e-waste would likely not appear as part of the dumpster audit conducted during the year. Students are responsible for disposing of their personal electronic waste at the City of Durango's yearly e-waste collection. The Environmental Center publicizes this event through its list serve and on its bulletin board. All cell phones are collected then donated to charity	waste from the campus and, sometimes, the community. Sonoma State University stores the e-waste they collect from campus in a 20' x 50' area and contract with a company to pick it up every couple of weeks. The program actually earns the school $4-$6,000 a year. They pay for CPUs to be hauled away but they get paid to collect and transport the CRT screens. California's laws encourage active e-waste programs at their colleges and universities. CU Boulder held a 3-day collection event sponsored by Dell

Recommended Low Target	Actions to Achieve Target	Responsible Parties	Cost/Resources Needed
Provide students with a means for properly disposing of electronic waste (WC √)	Establish a drop-off and inventory system for student e-waste. Collect and store student computers and monitors until city collection by outside vendor (WC √) Cost-benefit study of extending the computer refresh system	**Environmental Center** **Environmental Center** **Environmental Center**, IT	Making this service free to students would cost the College $20/computer and screen. This is the price the City charges during its waste collections. **Benefit/Payback Period** There would be no real payback for this program unless students could fix some of the equipment and resell it.

Rationale

The College generates very little e-waste due to its computer re-sale program and it seems to have a good outlet for the rest of its unwanted electronic equipment. Students on the other hand have no convenient outlet to dispose of their e-waste beyond the box collecting cell phones at the Information Desk. The City of Durango's e-waste collection charges for CPUs and other large items like televisions. Pagosa Springs charge its residents to store dropped-off e-waste; this money then goes to pay the City of Durango fees for disposal. The challenge with students is that many will pitch their e-waste rather than pay a fee. Education might help, but subsidizing storage and drop-off might help more. A subsidy of $200 would pay for disposal of ten computers. Once we know how much e-waste students have to dispose of, we could establish a firmer budget. Given space on campus, the Environmental Center could initially handle the collection and inventory of e-waste until the City's collection event. This could work well as part of the "free store" proposed as part of Objective 2.1. The City is also looking to set-up a drop-off/storage location for e-waste, but this is contingent on receiving funds for its new recycling facility.

Specific Ideas to Increase Sustainable Purchasing

Establish a Vendor Code of Conduct ☼☼

Join the Workers Rights Consortium ☼☼

Request recycled/recyclable packaging from your computer vendor (WC)

Commit to using low-VOC products, especially for liquid-based office supplies (e.g., correction fluid, glue, etc.) (WC)

Purchase items (such as trash & recycle bins, desk organizers, scissors) made at least in part from recycled materials (WC)

Buy vegetable (or non-petroleum-based) inks(WC)

Attempt substitutions for chlorinated, toxic solvents (WC)

Replace chromium oxide in green glazes (WC √)

Consider using a greener solvent for brushes and printing presses (WC)

Promote water-based acrylic paint (WC)

Purchase used furniture, where possible (WC)

Consider purchasing refurbished computer systems and parts (WC)

EPEAT (Electronics Rating System) Purchasing ☼☼

Buy ink jet printers rather than laser printers (ink jets use 80-90% less energy). (WC)

Buy smaller monitors (a 17-inch monitor uses 40% more energy than a 14-inch one). (WC)

Purchase paper towels with recycled content

Ensure that furniture does not contain old growth wood (purchase furniture made with Forest Stewardship Council [FSC]-certified wood) (WC, ☼☼)

Purchase furniture made from sustainably harvested materials derived from recycled content (i.e., specify this in purchasing contracts and ask vendors/suppliers for life cycle analysis [LCA] of products). (WC, ☼☼)

Consider using modular carpet systems (e.g. Interface or Shaw) that are come from recycled materials and use low VOC glues. (WC)

Create an easy way for departmental secretaries to record their purchases

See if local businesses would give discounts to FLC for sustainable products

Track purchases by FLC ID

Have departments work together to buy in bulk for long-lasting products

Increase obsolescence cycle of computers and computer-components to longer than 3 years to increase life-span and cut down on costs and reduce the impacts from production and disposal. (WC)

Section Title – Climate

Context & Current Situation

President Bartel signed the American College and University Presidents' Climate Commitment (ACUPCC) on April 6. 2007. This agreement commits Fort Lewis to come up with a climate action plan to achieve carbon neutrality. Colleges and universities across the country are taking up this challenge, each evaluating roughly the same list of strategies relative to their specific context.

The first step in this process is to conduct a greenhouse gas inventory. The Environmental Center worked closely with the consulting firm of Woodard and Curran to complete the College's first inventory in January of 2008. The inventory showed that during FY2006-07, Fort Lewis emitted the equivalent of 15,445 metric tons of CO_2 into the atmosphere. The College's distribution is typical for colleges: 51% comes from electricity, 25% from natural gas heating, 20% from transportation, and 4% from waste, agriculture, and fertilizers.

This inaugural effort was necessarily incomplete. Recordkeeping systems at the College did not allow for measuring the impact of official travel or the contribution of refrigerants or the carbon sequestration of the trees, shrubs, and soils on lands owned by the College. Relative to the overall total, the inclusion of these sources would not have dramatically altered the total. Future inventories will attempt to include this data. The College can set its own timeline to reduce the College's carbon count to zero and decide on the best strategies to employ. This document focuses on goals and actions over the next five years. A preliminary plan for the next fifty years is in the accompanying document, Strategies to Achieve Carbon Neutrality, which includes an appendix that evaluates the impact of numerous strategies related to energy, buildings, and transportation. This appendix is a valuable reference and summarizes research conducted by students at the Environmental Center.

A primary constraint in addressing climate issues is staffing. The biggest action the College can take to reduce greenhouse gas emissions is to engage in a performance contracting process that will allow the college to replace inefficient equipment. Physical Plant Services has lacked the staffing to do all they would like relative to energy efficiency. The hope is that once the College gets past the current building projects, staff will be available to manage a performance contract. Similarly, the Parking Office lacks staffing to enforce many of the ideas related under the transportation section of this plan.

Still, there are many opportunities to improve our performance with regards to climate. In terms of energy-use, Fort Lewis is installing electricity meters on all buildings that will help us understand opportunities to conserve. Fort Lewis' switch to the "one-card" system this fall that opens up new opportunities to provide incentives for various behaviors such as carpooling or riding public transit. Fort

Lewis also recently completed a study that asked the campus community to discuss parking issues on campus. Another opportunity is the new transit center downtown that will facilitate public transit around the county.

Strategic Direction: *To achieve carbon neutrality by emphasizing conservation, energy-efficiency, and strategic use of renewable energy.*

Goals & Objectives

The following symbols are included after some of the goals, objectives, indicators, and action steps listed below:

☼ - Part of the campus sustainability rating system from the Association for the Advancement of Sustainability in Higher Education (AASHE). Two stars equal a priority rating point.
WC – Recommendation from the consulting firm of Woodard and Curran; (√ means a "low-hanging fruit;" ◙ means a priority recommendation)

Goal 1: Reduce the environmental impacts of energy use
Specific Objectives:
- Reduce energy consumption ☼☼
- Reduce the environmental impact of the energy we do use

Goal 2: Seek to incorporate green building approaches and technologies into all construction and renovation.
Specific Objectives:
- New construction, renovations, and commercial interiors meet LEED-NC criteria ☼☼
- Existing building operations and maintenance meet LEED-EB OM criteria ☼☼

Goal 3: Reduce GHG emissions related to transportation
Specific Objectives:
- Reduce fossil fuel consumption from commuting ☼☼
- No net addition to parking on campus
- Reduce total fossil fuel consumption of the campus vehicle fleet ☼☼

Rationale

We have tried to simplify the goals and objectives by focusing each goal on one of the three primary areas responsible for greenhouse gas emissions: energy use, building design, and transportation. We cover policies related to other sources of greenhouse gas emissions such as fertilizers, waste, and agriculture in other sections of the action plan. To understand how these objectives relate to a long-term plan for reaching carbon neutrality, see the accompanying document *Strategies to Achieve Carbon Neutrality*.

Note that the names that appear in **bold** are the parties that would have primary responsibility for the listed action item. Other names listed would be involved in the planning or implementation.

Goal 1: Reduce the environmental impacts of energy use

Objective 1.1 Reduce energy consumption ☼☼

Potential Indicators	Chosen Indicators
kWh/year kWh/person kWh/sq. ft. of conditioned building space MMBtu/year MMBtu/person MMBtu/sq. ft. of conditioned building space Energy intensity (electricity + temperature control) normalized for heating and cooling days (measured in KiloBTUs). To convert kWh to BTUs you multiply them by 3.4128)	kWh/year kWh/person kWh/sq. ft. of conditioned building space MMBtu/year MMBtu/person MMBtu/sq. ft of conditioned building space Energy intensity (electricity + temperature control) normalized for heating and cooling days (measured in KiloBTUs). To convert kWh to BTUs you multiply them by 3.4128)
Rationale kWh and MMBtu are the measures of electricity and heating used by the Clean Air-Cool Planet Calculator for greenhouse gas emissions. We will collect these statistics each year as part of the greenhouse gas inventory and can easily convert these figures to KiloBTUs.	

Current Situation at FLC	Targets at Other Schools
During FY 2006-07, FLC used 11,136,000 kWh of electricity and 70,200.6 MMBtus of natural gas. Staff sporadically records the electricity and natural gas meters on the buildings and some meters serve multiple buildings so that we don't have precise data on energy use per building. With the new electricity meters this situation should improve. New construction, hoped for increases in enrollment, and the ever-increasing demand for computer power mean that while we seek to reduce energy use, we must overcome forces pushing FLC's energy equation in the opposite direction. Currently Student Housing unplugs student equipment during breaks, which we estimate saves 67,662 kWh/year or $4635.	CU-Boulder – Ongoing 5%/sq. ft. reduction UCCS – Reduction of energy intensity per sq. ft 20% below 2006 levels Colorado College – 30% increase in energy efficiency and conservation efforts Brown University – 20% reduction in existing buildings; 50% reduction below codes for new facilities

Recommended Target	Actions to Achieve Target	Responsible Parties	Cost/Resources Needed
Reduce energy use by 20% as per Governor Ritter's Executive Order	Install low-flow showerheads	**Environmental Center**, Student Housing	$2.2 million dollars. All but $8,400 of this money is for the performance contracting.
	Install Vending Misers on campus vending machines with next contract	**Auxiliary Services**, Coca-Cola	
			Benefit/Payback Period
	Research the life cycle costs and impacts of CFL light bulbs	**Environmental Center**	The payback period on these investments is 17 years, giving them a 6% rate of return.
	Create a CFL bulb program for students' individual lamps	**Environmental Center**	These action steps will lower our carbon footprint by just over 2300 tons each year, a 14% reduction in GHG emissions.
	Change policy to put FLC computers into sleep mode	**IT**	

	after 20 minutes. Energy conservation outreach program Performance contracting - phase 1 Achieve significant energy efficiency with new res halls Implement Energy Star purchasing policy Cluster room scheduling in summer to reduce cooling loads	 **Environmental Center**, Residential Life and PPS **Physical Plant Services** **Student Housing and Conference Services** **Purchasing** **Facilities Scheduling and Conference Services**	

Rationale

All of these measures except the feasibility studies have return rates of 6% or greater and so make financial sense for the college to pursue. We estimate the low-hanging fruit from performance contracting will reduce energy savings by 10%. The energy conservation campaign would package several strategies together such as departmental energy audits, res hall competitions, award programs, computer efficiency education, shorter shower campaign, holiday power down campaign for offices. We believe such a campaign can reduce energy use by 2.5%. The rest of the measures will reduce energy use another 2-5%, yielding a total 14.5-18% reduction. Achieving the last 2-5.5% to meet the Governor's executive order will be a challenge. We believe the next five years are also the time to study the potential for on-site generation of renewable energy. It is also difficult to gauge the impact of the new buildings on campus. These buildings are much more efficient and some will incorporate photovoltaic panels and solar hot water, but they also demand more energy use.

Other ideas requiring additional research that could help us reach the 20% target:

- Solar-powered outdoor lighting for pathways and parking lots (Yale, Babson College)
- Energy-efficient athletic field lighting (Light Structure Green technology)
- New cooling strategies for FLC data centers (IBM Project Big Green, Tufts)

• Reductions in lighting • Improve the efficiency of pool

Objective 1.2 Reduce the environmental impact of the energy we do use

Potential Indicators	Chosen Indicators
% of energy from renewable sources % of energy from fossil fuels Greenhouse emissions of energy used by the College/kWh or MMBTu	% of energy from renewable sources Greenhouse emissions of energy used by the College/kWh or MMBTu

Rationale

The % of energy from renewable sources is the standard measure for this type of objective, but the most accurate means of measuring this objective is to use the greenhouse gas emissions of the our energy use. For example, natural gas has less of an impact on the climate than coal-fired electricity. One could argue there are other environmental impacts associated with mining, nuclear power, hydroelectric, and even wind turbines that we should take into account. For example, Middlebury College, which has pledged to go carbon neutral by 2016, receives most of its electricity from nuclear power and the hydroelectric plants in Quebec. The Quebec projects in James Bay have devastated ecosystems and displaced native peoples. While it is absolutely necessary to account for these impacts, it is hard to devise metrics to compare and track them over time. We welcome suggestions for ways to incorporate non-climate related impacts into our selection of indicators.

Since Fort Lewis purchases its energy from off-campus sources, it is possible to address this objective either through a shift in the energy portfolio of our suppliers (LPEA and Atmos Energy), the purchase of renewable energy credits (RECs) that provide us with the environmental benefits of energy produced outside of La Plata County, or on-site generation.

The standard used in the AASHE campus rating system is percent of energy from a renewable project catalyzed by the institution (on- or off-campus), from utility-provided green power, or purchased RECs. Energy obtained from renewable sources through a power purchase agreement, or PPA, in which the RECs pass to another owner do not qualify under the AASHE system.

Current Situation at FLC	Targets at Other Schools

Fort Lewis uses natural gas to heat its buildings and water. Natural gas burns cleaner than coal. Currently only a tiny fraction of our energy comes from "green" sources. This from green power we purchased for the LEED-credit on Animas Hall. Tri-State's energy portfolio from which LPEA purchases electricity contains 1-2% renewable energy.	CU-Boulder 25% of energy from renewable sources by 2010 UCCS – 10% of energy is from renewable sources in five years Colorado College – 100% renewable energy in ten years UBC-Victoria – 20% reduction in energy from fossil fuels by 2014 Evergreen State College – purchases 100% of its electricity from renewable sources UCSC – produce 10 MW of on-site renewable energy by 2014 NAU – building a 15.9 MW biomass electricity plant UNH – building a pipeline to burn landfill gas (methane) to cover 80-85% of its energy needs

Recommended Target	Actions to Achieve Target	Responsible Parties	Cost/Resources Needed
Reduce greenhouse emissions per kWh and MMBtu used by the College Increase the % of renewable energy used by FLC	Study options for a power-purchase agreement for PV solar at the Old Fort and on-campus. Explore avenues to assess ground source heat potential on campus (through contractors, geosciences classes, contact with Mesa State)	**Old Fort Task Force** **Environmental Center**, Physical Plant Services	Approximately $2,800 is needed for the solar project. Investigating how to assess ground source heat potential on campus only costs staff time and much of this can be accomplished by students. **Benefit/Payback Period** A feasibility study will help the college decide whether to enter into a power purchase agreement that could provide up to 2 MW in electricity. Through the PPA, the College could purchase the equipment in 20 years or less. A ground source heat system

			review could payback in the form of 20-30% reduction in energy costs, if the location is feasible.

Rationale

We believe both targets are achievable during the next five years while the College studies its renewable energy options for the future. We believe that the % of renewables in LPEA's portfolio will naturally increase and that there will be opportunities for demonstration systems on campus that will help us meet this target.

If the College chooses to move forward with a power purchase agreement to build a solar farm on the Old Fort property, the energy company that would be part of the project would likely sell the RECs on the market to help finance the project. This means we cannot count the carbon offsets against our greenhouse gas totals, but we would still have helped increase the amount of renewable energy in the marketplace and we would likely be purchasing energy from the company at a fixed rate. Whether to move forward with such a system is a policy decision about how we internally evaluate our progress and present our actions to the public. We could negotiate a lower price for the RECs associated with the agreement and purchase these to retain the environmental benefits associated with this power.

A ground source heat system for the two new apartment buildings planned to replace the Mears Apartments will account for just over 1% of our heating load. Until we complete a detailed study, however, we do not know if such a system is feasible or the exact cost, though we think it would cost between $90 and $100,000. Such a system would likely have a five-year payback period, possibly less if energy prices rise above FY2006-07 levels. There has been discussion of replacing the grass on the stadium field with artificial turf. This would present an opportunity to install a ground source well system.

We do not recommend purchasing renewable energy credits at this time, unless it is associated with the solar farm project or part of a LEED application for a new building. The best investment of our time is in conservation and increased efficiency on campus.

Goal 2: Seek to incorporate green building approaches and technologies into all construction and renovation.

Objective 2.1 New construction, renovations, and commercial interiors meet LEED-NC criteria ☼☼

Potential Indicators	Chosen Indicators

# of new buildings meeting a particular level of LEED certification % of building space covered by LEED certification	# of new buildings meeting a particular level of LEED certification
Rationale The United States Green Building Council established the LEED (Leadership in Energy and Environmental Design) system as the common standard for rating green building. A percentage of gross square footage that qualifies for LEED designation is not a linear function and is dependent on individual building projects. On a small campus it's not as effective an indicator.	

Current Situation at FLC	Targets at Other Schools
As part of the Presidents Climate Commitment, President Bartel pledged that all new construction would meet a standard of LEED-Silver. Governor Ritter has since established a state policy that all buildings receiving state funds will meet a LEED-Gold standard. FLC currently has three new buildings under construction: the Student Union addition, Animas Hall, the new Biology wing of Berndt Hall. The target for Animas Hall and the Student Union addition is to achieve a LEED-Gold rating. These will be the first LEED buildings on the FLC campus. The Student Life Center, while not LEED-certified was the greenest building in La Plata County for almost a decade and provided the community with an effective example of green building. A number of other capital projects are planned for the future.	61% of colleges have at least one LEED-certified building 59% have green building policies Emory has adopted a LEED-Gold standard for all of its new construction LEED Buildings at Colorado Campuses as of December 2007 Colorado State University - Guggenheim Hall (LEED-Silver) CU-Boulder - Memorial Center Student Union (LEED-Silver) CU-Boulder - ATLAS Building (LEED-Gold) Colorado College – Science Center (LEED certified) University of Denver - College of Law Building (LEED-Gold)

Recommended Target	Actions to Achieve Target	Responsible Parties	Cost/Resources Needed
Achieve at least a LEED-Silver rating with a target of LEED-Gold for all new construction	Articulate a formal green building policy (WC ◙)	**Physical Plant Services**, EC, Student Housing	As this is the policy of the College already, no additional resources are needed.
			Benefit/Payback Period

			With integrated design, LEED designs can save the College money over the life of the building and provide a platform for education about sustainability

Rationale

Adopting a formal green building policy was a primary recommendation of Woodard and Curran coming from the sustainability assessment. While the Presidents Climate Commitment and the state standard establish an overall level of performance, a green building policy would go further to identify priorities within the LEED system for the College's specific situation. For example, a green building policy could specify that achieving the water-related credits for LEED is a priority because of our arid climate. A policy could also specify an energy efficiency standard for new buildings or for different building types. This policy should track closely with the overall Sustainability Action Plan and the College's strategy for achieving carbon neutrality. For example, if the College pursues a ground source heat pump well field, using this system could be a part of a green building policy. Finding ways to link the construction and operations and maintenance budgets on projects would provide more incentive to pursue higher-efficiency standards and would make the projects more cost-effective.

Objective 2.2 Existing building operations and maintenance meet LEED-EB OM criteria ☼☼

Potential Indicators	Chosen Indicators
# of new buildings meeting a particular level of LEED-EB OM certification % of building space covered by LEED-EB OM certification	# of new buildings meeting a particular level of LEED-EB OM certification

Rationale

The rationale is the same as above for choosing to follow the LEED-EB OM criteria.

Current Situation at FLC	Targets at Other Schools

The architects working on the Student Union renovation are hoping to achieve a LEED-EB OM rating.	UC-Santa Barbara – Working to get five buildings certified under the LEED-EB system each year for the next five years.

Recommended Target	Actions to Achieve Target	Responsible Parties	Cost/Resources Needed
Achieve LEED-EB OM for one building on campus Put in place the systems and policies necessary to achieve all the LEED-EB OM prerequisites	Articulate a formal green building policy (WC ◙) Performance contracting - phase 1 Explore ways to link the construction and operations and maintenance budgets for new projects	**Physical Plant Services**, EC, Student Housing **Physical Plant Services** **Administration,** PPS	Performance contracting and creating a green building policy would take staff time. The actual certification process would cost money as well. We are trying to find out how much. **Benefit/Payback Period** Cost savings from a LEED-EB rating are difficult separate out from normal operating procedures. A LEED-EB rating would provide us with another opportunity to educate occupants about sustainability.

Rationale

The "OM" stands for "Operations and Maintenance" and most of the LEED-EB OM credits are for practices and policies on campus or in managing the building rather than for the building itself. The following are prerequisites for the current version of the LEED-EB OM system:

- Minimum indoor plumbing fixture and fitting efficiency
- Energy Efficiency and Best Management Practices: Planning, Documentation, and Opportunity Assessment
- Minimum Energy Efficiency Performance
- Refrigerant Management: Ozone Protection
- Sustainable Purchasing Policy
- Solid Waste Management Policy'

- Outdoor Air Introduction and Exhaust Systems
- Environmental Tobacco Smoke control
- Green Cleaning Policy

Implementing the Sustainability Action Plan will achieve many of the LEED-EB OM prerequisites and credits. The minimum energy efficiency performance prerequisite is the only one that should be challenging for FLC to meet. This prerequisite states that buildings must have a better energy performance than 65% of the buildings of that type. With older buildings such as the SUB, this standard might be difficult to meet without fundamental retrofits to the building envelope that can be prohibitively expensive. It's not clear if the renovations to the existing SUB will be able to achieve this prerequisite. If not, our hope is that the first round of performance contracting above will be able to pull the newer buildings such as EBH, Chemistry Hall, the Center for Southwest Studies, West Hall, and the Student Life Center above this standard.

Goal 3: Reduce GHG emissions related to transportation

3.1 Reduce fossil fuel consumption from commuting ☼☼

Potential Indicators	Chosen Indicators
Total number of miles driven % of trips to campus that are "drive alone" trips % of trips to campus that are carpool trips % of trips to campus that involve public transit % of trips to campus that via walking or biking Average vehicle ridership (AVR)	% of trips to campus that are "drive alone" trips % of trips to campus that are carpool trips % of trips to campus that involve public transit % of trips to campus that via walking or biking

Rationale

While the total number of miles driven is a more accurate measure of this objective, it requires a more precise measurement of the distance each commuter travels to campus. Looking at the percentage of trips, or mode split, is easier to ascertain. FLC collected this data for the first time in the fall of 2007 with the Environmental Center's commuter survey. It would be good to match the survey with actual traffic counts coming up the hill. The College's geography helps in this regard. The limited number of entrances provides an opportunity to collect more accurate data. UC-Santa Cruz, which is also located on a hill, has been able to monitor all mobile traffic that enters campus.

Current Situation at FLC	Targets at Other Schools
The current mode split for the college is: Drive alone 41% Carpool/Vanpool 18.6% Public Transit 7.6% Bike 10.3% Walk 22.5% Total 100% The primary vehicle that FLC uses to discourage driving alone to campus is a bus pass provided to students and faculty. For FLC's size, this is a strong start toward creating a transportation demand management program. Parking fees are low relative to other institutions and so there is little financial incentive to explore other transit modes. The recent parking study suggested several recommendations to address complaints about the parking situation on campus, including raising parking fees. FLC does not have a formal bike or pedestrian program. Outdoor Pursuits will check out mountain bikes for a week at a time to OP members. This program is in high demand and their 13 bikes are almost always in use. Campus police currently have only one registered carpool on campus. Finally, there is currently no staff support for promoting or coordinating alternative transit on campus. Brad Hitti manages the contract process for the Durango T and there is a single student representative to the Transit Advisory Board.	One should compare our mode split to that of other schools with caution. Differences in geography, housing costs, and the scope of measurement (e.g. UC-Santa Cruz dos not include on-campus residents in their mode split). Most colleges and universities do not set, or at lease divulge, targets for their mode split. It is often difficult to separate the impact of a TDM program from other variables, such as high gas prices. Several schools have had success, however, through a combination of transit passes, parking rates, and incentive programs. University of Washington: reduced drive alone trips 10% Stanford University: reduced drive alone trips 20% UC-Santa Cruz reduced drive alone trips 33% While these drive alone trips converted primarily to bus trips at UW and UCSC. At Stanford they went to commuter rail and bike trips. Almost all schools with TDM program rely heavily on parking revenues to subsidize the program.

Recommended Target	Actions to Achieve Target	Responsible Parties	Cost/Resources Needed
In five years:	Begin a Transportation Demand Management (TDM)	Students can facilitate a tremendous number of the	The total capital cost for the actions listed is approximately

Phase 1 Target Below is a target mode split for five years from now. Drive alone 37% Carpool/Vanpool 19% Public Transit 9% Bike 11% Walk 24% Total 100% Achieving this mode split would reduce GHG emissions by 187 MTCe.	Program with the following components: • Outreach campaign • Preferential parking for carpools • Reduced parking rates for low-emission vehicles • Emergency Ride Home reimbursement • Transit passes for staff • Commute Club Incentives • Bike registration • Showers and lockers access for cyclists • Facilitate self-maintenance of bikes • Bike clinics and workshops • Parking management strategies Conduct a feasibility study for a more intensive assessment of TDM strategies than we can provide here.	actions steps listed and many of these could be pursued through the **EC**. Collecting research on campus transportation can also become part of a class project. For these action items to have the most impact, however, FLC should consider hiring a transportation coordinator. A part-time student could fill the position for the next five years and get the program going. The college could then decide whether to allocate parking money to fund a permanent position. Other people responsible on campus would be **PPS** and the **parking committee** that oversees the parking rates and infrastructure.	$10,000, which would pay for an assessment of effective TDM strategies for the College. The University of Victoria that works extensively with TDM programs suggested that we could complete a basic, initial TDM study for a few thousand dollars. A more extensive evaluation would cost about $20,000. The estimated annual cost of the listed items totals $21,208. This would pay for bus passes for staff, incentives for transit users, and and an outreach campaign. It also factors in a loss in parking revenue due to an increase in carpooling. If the College decides to raise parking fees, it could pay for many of these initiatives with a small percentage of the additional revenue. Grants for capital items might also be available. **Benefit/Payback Period** The benefits of the TDM strategies we have listed are

			indirect and include: • Projected reduction in GHG emissions by 187 MTCe • Increased health and safety • Increase in the availability of parking

Rationale

We have budgeted $10,000 for a TDM feasibility study. We think this amount would get the College a fairly high-level study of general directions to go in with a TDM program. The Environmental Center's commuter survey and the existing parking study can provide some baseline data for such a study. There is a strong argument for spending more to get a more detailed assessment and more specific recommendations, but to a certain degree TDM programs require experimentation to find out what works. This is the reason that we feel the focus for the next five years should be on setting up the mechanism to capture and analyze information, while providing some basic operating costs to try some small initiatives. One immediate opportunity in lieu of the revenue to fund such a study is work with the Region 9 Economic Development District Regional Transit Committee that has recently hired an Americorps volunteer to work on these issues. This position can perhaps provide support to the College's planning efforts.

One initiative that we feel will benefit from more detailed study is the potential for an aerial tramway from downtown Durango to the Fort Lewis College campus. Funded through a combination of public and private dollars, we feel such a system could significantly reduce the number of drive alone trips to and from campus and be a distinctive feature that will boost enrollment. Fort Lewis would be only the second campus in the country to integrate a tramway into its commuting profile.

Another item that received a lot of discussion was an expansion of the OP bike checkout program. In the end, PACEA felt this was too expensive to include in the plan at this time. Students felt that this would provide more visibility to the non-driving commuters and help create a stronger culture of non-auto use.

Other ideas put into phase 2 of the climate action plan included: Vanpool program, create a more effective rideshare program, begin a carsharing program, support an aerial Tramway, additional bus services for FLC riders, covered bike parking on campus, bicycle shuttle, no-interest loan program for bicyles, flexible work scheduling

3.2 No net addition to parking on campus

Potential Indicators	Chosen Indicators
# of parking spaces on campus	# of parking spaces on campus

Current Situation at FLC	Targets at Other Schools
FLC just completed a parking study in response to issues raised over the course of a number of years. The study concluded that while there is enough parking at FLC, there is intense competition for space in specific locations. The study revealed a strong desire by some faculty for designated faculty parking near their office. The parking committee is currently meeting to review the study and consider recommendations including changing the fee structure so lots in higher demand cost more.	Many other schools implement transportation demand management programs in response to a lack of adequate parking. When compared with the cost of building new parking structures, TDM programs save institutions money. One of the challenges experienced by other school is that most TDM programs are funded almost exclusively by parking revenues. As their programs become more and more effective at getting people out of their cars, they lose revenue for their program.

Recommended Target	Actions to Achieve Target	Responsible Parties	Cost/Resources Needed
In five years: No net addition to parking on campus	Begin a Transportation Demand Management (TDM) Program with the strategies listed in objective 3.1 Conduct a feasibility study for a more intensive assessment of TDM strategies than we can provide here.	As stated above, student staffing could accomplish a lot in the early stages of a TDM program.	As stated above we believe the initial stages of a TDM program would cost just over $31,000. We believe that grants might be available to offset some of these costs and that the rest could come from a portion of the parking fee increases. **Benefit/Payback Period** In addition to the benefits listed above, the provision of alternative transportation benefits and services will make

			any increase in parking fees easier to justify to the FLC community.

Rationale

While there is ample parking available now, if enrollment increases dramatically, there will be more demand. Being able to hold the number of spaces constant over time will be a measure of the success of an alternative transportation program. Some have suggested relocating or centralizing parking in different locations on campus. Building a parking structure often happens by the College taking on debt with the assumption parking revenues will pay for the structure over time. While it is possible to meet the objective of "no net addition" to parking through a central parking structure and the removal of surface lots, it almost demands that people keep driving and parking on campus to pay off the debt. This can put the parking structure at cross-purposes with any TDM program the College tries to establish. This is the situation at UCSB and was mentioned in their climate action plan.

3.3 Reduce total fossil fuel consumption of the campus vehicle fleet ☼☼

Potential Indicators	Chosen Indicators
GHG emissions from the vehicle fleet Gallons of gasoline and diesel consumed	GHG emissions from the vehicle fleet Gallons of gasoline and diesel consumed

Rationale

Both of these indicators are important. The Governor's Executive Order mandates a 25% reduction in petroleum consumption by state-owned vehicles by 2012. The intent of this objective, however, is to reduce GHG emissions.

Current Situation at FLC	Targets at Other Schools
From November 2007 to November 2008, the vehicle fleet drew an estimated 14,827 gallons of gasoline and 3,080 gallons of diesel from the fueling station on campus. Fuel use is relatively easy to track, though we currently have no way of recording fueling off-campus by vehicles in our rental pool. We assumed that 10% of the fuel used by these vehicles came from off-campus	UCSB and CU-Boulder have fleet purchasing policies stating an intent to purchase alternative-vehicles whenever possible. Appalachian State, Dickinson College, Sinclair Community College, and the University of Kansas all have small, student-run biodiesel processing facilities on their campus.

and added this to their total for the GHG inventory. Our initial inventory attributed 177 MTCe to the vehicle fleet. While a handful of vehicles in the fleet are "E85 equipped," which means that they can take ethanol or "flex fuel." This is currently not available in our region. Nor is biodiesel. We believe this situation will change in the next five years and that there is even strong potential to produce biodiesel on campus for use in the campus fleet. Currently, Physical Plant replaces vans in the rental pool every three years, while the intention is for utility vehicles to remain in the fleet for at least 12 years.	Oregon State recently entered into a purchasing agreement with Miles Automotive to supply electric pick-up trucks for their fleet UNC-Charlotte has invested in 56 two- four- and 15- passenger electric vehicles to perform several on-campus functions, including grounds keeping, maintenance, housekeeping and parking lot management. These vehicles reduce the university's petroleum consumption by 6,500 gallons, saving $6,400 in annual fuel costs.

Recommended Target	Actions to Achieve Target	Responsible Parties	Cost/Resources Needed
In five years: Lower the amount of petroleum-based diesel fuel used by the campus fleet to 2310 gallons (25% reduction) Reduce GHG emissions from the vehicle fleet by 7 MTCe.	Establish a small, student-run, closed loop, biodiesel processing on campus Set-up a system to evaluate the environmental attributes of potential vehicle purchases Purchase vehicles with environmental benefits whenever there is a positive $$/MTCe ratio for the choices under consideration. Establish a system to track and record fuel purchasing off-campus	**Environmental Center**, Engineers without Borders, Engineering Department, PPS **Environmental Center**, Physical Plant Services **Physical Plant Services** **Purchasing**, Physical Plant Services and IT	Using numbers from a pilot project at Appalachian State, the materials cost of small biodiesel processing plant would be $40,000. The school accomplished this project with all volunteer labor and a grant from the EPA. Operating costs were $1767/year ($0.75/gallon). The rest of these initiatives require minimal investment. **Benefit/Payback Period** The payback period for a biodiesel facility depends on the amount of biodiesel students can produce, the initial capital costs for building a facility, and regular

	Implement a no-idling policy. Explore a purchasing agreement with a local gas station to provide E85 for campus-owned flex fuel vehicles.	**Physical Plant Services** **Physical Plant Services**	maintenance costs for equipment. Transferring the costs from Appalachian State, this plant would pay for itself in just under 16 years. If you budget in a $1000 for maintenance, the payback period jumps to 26 year. However, we need a much smaller facility that ASU constructed. If you cut the up front capital costs in half to $20,000, the payback rate goes back down to 13 years.

Rationale

We have evaluated numerous scenarios for turning over the current fleet of vehicles and believe with current technology it's possible to reduce GHG emissions between 30 and 40%. But the market for alternative vehicles is changing rapidly and so it does not make sense to propose replacing specific vehicles in the fleet at this time. The turnover of the entire vehicle fleet will take over a decade. The research completed by the Environmental Center for this section can easily be adapted to create a spreadsheet tool to evaluate the environmental attributes of various choices when it comes time to replace a vehicle. In preparing this plan, we were able to calculate the cost offset ratio ($$/MTCe) for a number of vehicles. Whenever this number is positive it means the College will save money over the life of the vehicle while also reducing emissions. This can be a quick guide to purchasing the most cost effective, environmental-friendly vehicles.

The cost and payback numbers for the installation of small biodiesel processing facility on campus is reasonable and deserves consideration. Given the cold weather, we would need to switch seasonally from B20 to B50 to B100 in the summer. During the middle of winter we would have to use regular diesel fuel for the snowplow. Looking at all these factors, we estimate that there is the potential to replace approximately 1171 gallons of purchased diesel fuel, saving the college $4322/year. This assumes an average of $3.69 per gallon. Donations of the necessary materials, finding an existing building on campus to accommodate the project, or building a smaller facility would help bring down the payback period. Given our climate, we would look to produce roughly 2600 gallons biodiesel per year. Currently, Sodexho donates approximately 40 gallons/week of high quality waste vegetable oil to San Juan

Bioenergy for biodiesel experimentation. Assuming a slight loss in the conversion process from cooking oil to biodiesel we could use this to generate approximately 1200 gallons of biodiesel (40 gallons * 30 weeks of school and 4 weeks of large conference groups during summer). Additional oil needed to reach the desired 2600 gallons would have to come from local restaurants.

An unanswered question for such a plant is where we put such a facility on campus. Based on the experience at Appalachian State the facility requires approximately 400 square feet and a space for a small greenhouse to help process the wastewater, though we believe our facility could be smaller. The Appalachian State facility had the capacity to produce 21,000 gallons a year, meaning a much smaller facility is possible. Issues related to fire hazards for existing buildings and snow load for any new construction need resolution before moving forward, however. Other benefits to this project, however, include the potential to integrate the project into the curriculum and potential to generate funds for clubs such as EWB. For example, students at App. State used the glycerin by-product from their facility to make and sell soap.

While biodiesel production can potentially reduce our diesel use by 38%, allowing us to easily meet our self-imposed target, it will reduce our overall petroleum consumption (gas and diesel) by 7%, falling well short of Governor's goal. Further reducing our petroleum consumption wait for the availability of much more efficient vehicles and alternative fuels in our area.

Section Title – Education and Engagement

Context and Current Situation

We often equate education with information. For example, in the study circles, we asked participants to offer ideas for increasing literacy about energy, water, waste, etc. But literacy is not enough. Research shows that information alone does not have a strong influence on behavior. The focus of this section is on involvement of the Fort Lewis community. Literacy, understanding, awareness, and information are necessary, but not sufficient, to effect the cultural shift that many involved in this planning process have discussed. The scope of this section includes the official curriculum, co-curriculum programs, and employee training and orientation.

There is quite a bit of overlap with the other sections of the plan. Under the different performance sections there were action items related to boosting participation in energy conservation, alternative transportation, recycling, and water use. The section on service to the region will involve many of the same concepts and methods outlined here. Finally, the culture of an institution is tightly bound to the issues of decision-making, communication patterns, and strategic planning that the coordination and support section will address.

In terms of the curriculum, the faculty sets the direction for the College, although it must work within the constraints set by the Colorado Commission on Higher Education. In the fall of 2006, the faculty senate approved the new Environmental Studies degree program after a difficult and oftentimes contentious debate. The new program is the degree at Fort Lewis College that most directly addresses sustainability concerns and like sustainability seeks to integrate the natural sciences, the social sciences and the humanities. In addition, there are several other courses that address sustainability concerns. The Integrated Learning Program (ILP), a cluster of courses for incoming students, has had sustainability as a general focus for many years. But, after much debate, the faculty decided to not to explicitly include "sustainability" as a theme in the Education for Global Citizenship general education program. Other constraints include the requirements for the School of Business Administration to maintain its accreditation. This makes it difficult to incorporate sustainability into business classes. As almost a quarter of the student body receives its degree from SOBA, this represents a significant challenge in terms of reaching the student body. Finally, the small nature of the departments with the applied and technical expertise related to sustainability, specifically agriculture and engineering, limit the ability of college to offer the full range of sustainability classes.

The Environmental Center is the primary co-curricular program that addresses sustainability at the College, and the Center receives a steady stream of requests to provide educational services to the campus on everything from recycling to climate to wildlife habitat. Work-study students carry out EC programs and initiatives with guidance from the EC coordinator. There is a perception that the Environmental Center should handle all co-curricular education related to sustainability. Given the decentralized nature of the College it would likely be more effective for several departments to share this responsibility. Potential additional avenues for the delivery of

education about sustainability include: the Common Reading Experience, Freshman Orientation program, residential life, Center for Civic Engagement programs, and other student clubs and organizations.

In terms of co-curricular initiatives, the Sustainability Action Planning process itself represents an important opportunity to increase education and engagement of students. The new LEED-certified buildings also represent a significant opportunity to teach about sustainability through signs, real-time data displays, and tours. The Environmental Center has also partnered with residential life to create the LIFE House program, which has an explicit focus on sustainability. Lessons from this program could reveal successful ways to engage other students living on campus. The sustainability assessment revealed, however, that the decentralized nature of Fort Lewis College makes conveying information and "aligning" the College around particular themes or ideas extremely challenging.

Unfortunately, there are few models for campus engagement for FLC to follow. Most schools focus on individual activities and initiatives that presume vague connections between awareness, understanding, and participation. These activities do have an impact, but to achieve the greatest effect they should be part of a comprehensive strategy. Few, if any, schools have put in the thought necessary to make this a reality. The credits in AASHE's education section also consist of a scattered set of activities rather than a clear set of building blocks for campus involvement. By contrast, we have constructed an integrated model for campus engagement based on conversations with the Honors 220 students who facilitated last spring's study circles, and our own observations from trying to garner participation for the Environmental Center programs and initiatives.

Students from the honors class noted the following conditions at FLC:
- Lack of common venues for interaction and a sense of isolation for students
- Lack of knowledge of how FLC makes decisions hinders student involvement
- Need to increase the visibility of sustainability through every day interactions
- Need to have open debate and dialogue about sustainability and to make clear there is no right way to think
- Importance of engaging staff, faculty and administration since they can serve as models for students

The Environmental Center has its own approach to public involvement and we added these tenets to the student observations above:
- Emphasize relationships rather than information to get people involved
- Make sustainability meaningful by connecting the idea to an individual's past life and desired future
- Make small actions/projects meaningful by connecting them to a larger vision
- Find ways to connect sustainability to people's basic needs
- Provide many levels of involvement
- Celebrate successes and reinforce positive behavior

Finally, to make our model effective, we feel it must do four things:

- Illustrate the connection between sustainability, the College's educational mission, and the liberal arts experience.
- Work through diffusion to capitalize on FLC's decentralized nature
- Build on what people love about FLC
- Focus on offering a rich array of co-curricular opportunities that faculty can take advantage of, rather than trying to formally advance sustainability in the curriculum

Model for Education and Engagement

After the 3-2-1 Sustainability Initiative during the spring of 2008, the honors students who facilitated the circles crafted the following vision for the education section of the Sustainability Action Plan:

Within three months, members of the FLC community have a working knowledge of existing sustainability programs. In addition, by the time a community member leaves Fort Lewis College, he or she has demonstrated leadership on sustainability issues and is prepared to be a sustainability leader in their community.

In discussing this portion of the plan, PACEA noted the importance of considering all points of view about these issues as an important part of being a sustainability leader. The Council felt this was in line with providing a liberal arts education. We have integrated this into the strategic direction below.

Achieving this vision, will require linking what happens at the "institutional" level, comprised of formal roles, decision-making structures, and policies and the "grassroots" level made up of individual's interests, informal structures, such as student clubs and organizations (see model). Our model for engagement seeks to connect these two levels through programs and initiatives that will fuel institutional learning about sustainability. We believe shifting the culture requires working from both the top-down and from the bottom-up so that everyday actions link back to college policies and institutional structures. In essence, we see the purpose of an education program as creating an effective feedback loop between these two levels.

We posit that to effectively connect these two levels and move toward the students' vision, certain conditions must exist. Creating these conditions constitute the goals of this section of the plan. The objectives and the corresponding targets will help FLC achieve and maintain these conditions over time. Finally, progress toward the vision will have "ripple effects" on the larger contexts that influence the character of both the grassroots and institutional levels. Hopefully, these ripple effects will support the changes we are hoping to create.

Evaluating the impact of an educational program is always difficult. To create a chain of cause and effect, one must evaluate a program at different levels. The higher level asks the large question of whether we are achieving the vision: "Are people engaged?" "Do people have the skills to be a leader?" We believe the best way to evaluate these questions is through a general sustainability survey coupled with focus groups. We will explore the specifics of implementing such a survey in the coordination and support section of the plan. At the lower level, it's important to evaluate whether we are achieving the specific goals and objectives that support the vision. For this we have chosen specific indicators and targets that can serve as program measures.

Strategic Direction*: Members of the Fort Lewis College community will quickly gain a working knowledge of existing sustainability programs and upon leaving Fort Lewis College will have the capacity to be a sustainability leader in their community with the ability to consider and integrate all points of view.*

Goals & Objectives

Goal: Make sustainability meaningful for the campus community

- Connect sustainability to community members' past experiences and desired future*
- Connect every day actions to impacts on the local community and larger world
- Enhance opportunities to incorporate sustainability into the curriculum*

Goal: Make sustainability a community effort

- Use sustainability to strengthen the sense of community and common purpose at Fort Lewis College*
- Increase participation in sustainability project planning and implementation
- Promote an ongoing dialogue and debate around sustainability issues*

Goal: Increase the visibility and transparency of sustainability efforts

- Make sustainability an unavoidable part of the Fort Lewis experience*
- Improve access to progress and decision-making related to sustainability

Goal: Provide a means to translate ideas and interest into effective action

- Connect motivated individuals with helpful individuals and organizations
- Provide guidance and resources for grassroots initiatives*

(* objectives identified by the student committee and PACEA as the most important to achieve)

Rationale

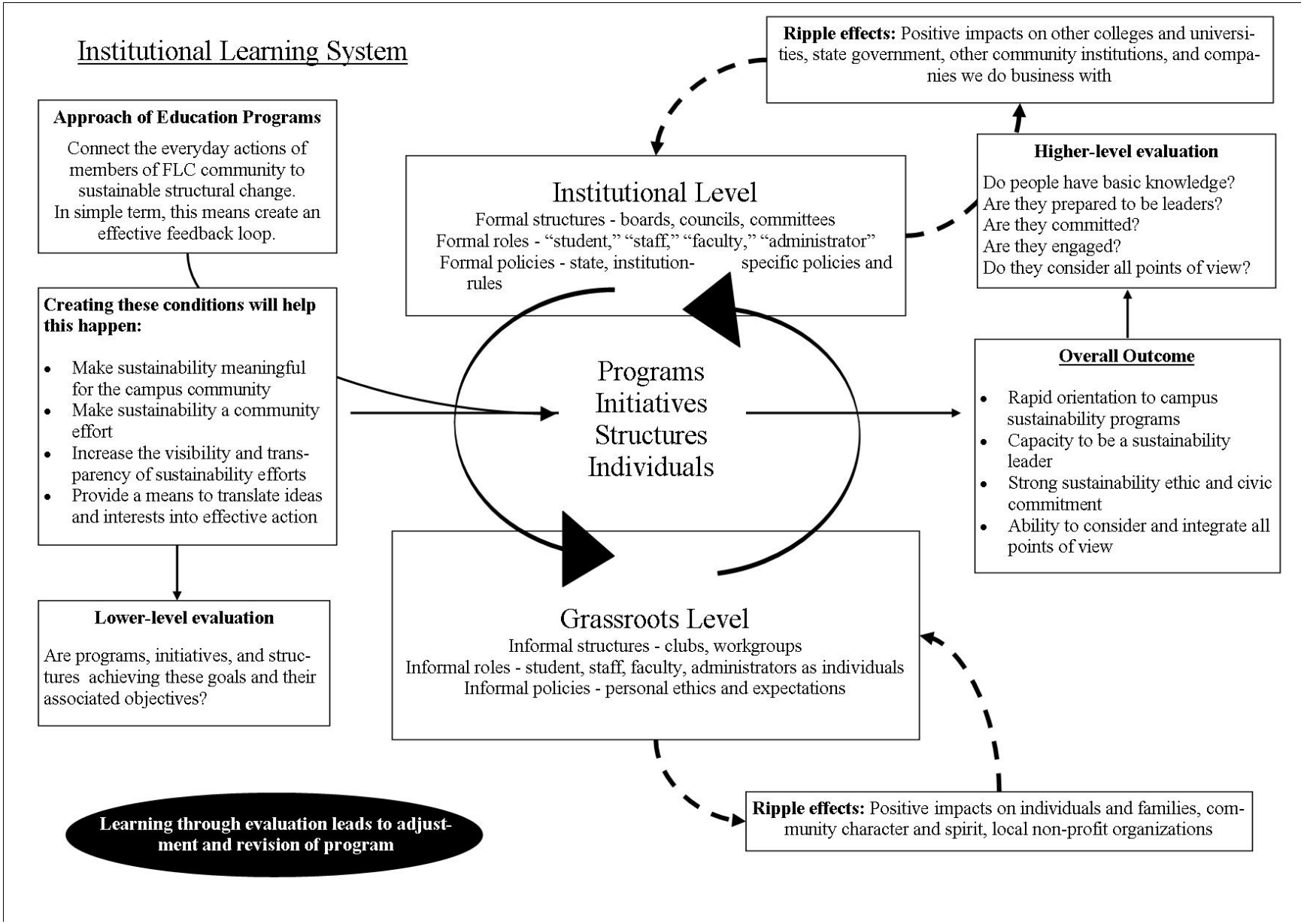
These four goals and their associated objectives represent the key conditions we feel must exist to achieve the students' vision of for sustainability leadership. We base the choice of these goals and objectives on certain assumptions.

Goal 1 – We assume that while understanding is important, making the issue of sustainability meaningful will spur action. The first objective seeks to make sustainability meaningful at a personal level. The second highlights the importance of everyday actions. The third objective strives to connect sustainability to the broader intellectual themes in the curriculum. This objective, however, leaves control of the curriculum firmly in the hands of the faculty and individual instructors. The focus here is on providing opportunities that can enrich the teaching environment.

Goal 2 – While the first goal focuses on the individual, the second seeks to take advantage of the social environment. We believe the decentralized nature of campus makes it difficult for individuals and groups on campus to connect with each other and that this hinders progress on cross-campus initiatives. The first objective seeks to use the sustainability programs to build relationships. We believe this is an issue around which the FLC community can come together. The second objective targets participation in project planning and implementation as the richest form of engagement. The third objective assumes that a community effort benefits from active dialogue and debate. For example, in 2007 a student article last year questioning the value of corn plastic eventually led to a partnership with a local company resulting in compostable trays in the Hungry Hawk Snack Bar.

Goal 3 – The third goal takes aim at the visibility of sustainability on campus, both in terms of specific initiatives and the general atmosphere on campus. This is akin to what David Orr calls the "shadow curriculum" of a college campus, the messages that permeate daily interactions with the physical and social environment.

Goal 4 – The final goal is about building the capacity of individuals to effect change and focuses on two objectives. The first involves networking and the second involves training and resources.


Institutional Learning System
Ripple effects: Positive impacts on other colleges and universities, state government, other community institutions, and companies we do business with
Approach of Education Programs
Connect the everyday actions of members of FLC community to sustainable structural change.
In simple term, this means create an effective feedback loop.
Institutional Level
Formal structures - boards, councils, committees
Formal roles - "student," "staff," "faculty," "administrator"
Formal policies - state, institution-specific policies and rules
Higher-level evaluation
Do people have basic knowledge?
Are they prepared to be leaders?
Are they committed?
Are they engaged?
Do they consider all points of view?
Creating these conditions will help this happen:
Make sustainability meaningful for the campus community
Make sustainability a community effort
Increase the visibility and transparency of sustainability efforts
Provide a means to translate ideas and interests into effective action
Programs
Initiatives
Structures
Individuals
Overall Outcome
Rapid orientation to campus sustainability programs
Capacity to be a sustainability leader
Strong sustainability ethic and civic commitment
Ability to consider and integrate all points of view
Lower-level evaluation
Are programs, initiatives, and structures achieving these goals and their associated objectives?
Grassroots Level
Informal structures - clubs, workgroups
Informal roles - student, staff, faculty, administrators as individuals
Informal policies - personal ethics and expectations
Ripple effects: Positive impacts on individuals and families, community character and spirit, local non-profit organizations
Learning through evaluation leads to adjustment and revision of program

While the audience for this program is the entire Fort Lewis community, we believe that the most important audience is first-year students who live on campus. While our goals and objectives reinforce one another, this is the place to start. The first few weeks on campus are especially important in setting norms for each class and can pay larger dividends down the road. The program tries to reach upper-level students through curriculum-based programs and projects.

Regularly monitoring of our performance is critical to see which strategies are most effective. The College administers a National Survey of Student Engagement every two years. This could provide a means for assessing the effectiveness of sustainability education programs.

Because there is no direct financial returns on investment in education and public involvement, the committee should consider coupling some of these initiatives with the strategies from the other portions of the plan that generate revenue or savings. Another alternative is make implementation contingent on outside grant funding.

Note that the names that appear in **bold** are the parties that would have primary responsibility for the listed action item. Other names listed would be involved in the planning or implementation.

Goal 1: Make sustainability meaningful for the campus community

Objective 1.1 Connect sustainability to community members' past experiences and desired future*

Potential Indicators	Chosen Indicators
Number of events that incorporate students' stories Number of sustainability stories featured in campus media Participation in story events and programs	Participation in story events and programs Survey responses Interview responses
Rationale This objective fundamentally has to do with illuminating ties between aspects of sustainability and individuals' personal narrative. As the proposed events and activities are the means for making these connections, participation in these activities should be the primary measure. Whether this connection proves lasting is another question. For this we would rely on the general entry and exit surveys and focus groups proposed above.	

Targets at Other Schools CSU – Has a living-learning community: "Live Green" Community Colorado College - Living-Learning Community: Synergy House- 6 students live-in- actually have own garden, composting system, etc.

Five-year target	Ideas for Action	Responsible Parties	Cost/Resources Needed
10% of campus population will have participated in one of the listed programs	Digital storytelling to connect sustainability where people are from to sustainability in the Four Corners region.*	**EC** in partnership with new media center and IT	Total cost for listed actions is approximately $6,000, assuming current staffing levels for the Environmental Center.
	Sustainability field trips during which participants share related stories from home.	**EC**, ENVS program	$2,750 for digital storytelling workshop to train staff how to facilitate a program
	Sustainability storytelling sessions based on a theme (e.g. water, energy, etc.) with local sustainability experts.	**EC**, ENVS program	$2,250 for sustainability field trips. Approximately six trips a year for five years at $75/trip for rental and fuel.
	Work with Career Services and SOBA to educate students about careers in sustainability (e.g. green career fair)	**EC**, Career Services	$300 for food for sustainability storytelling sessions $700 for advertising and promoting these events over five years.
	Incorporate a sustainability category into the Skyhawk Job Source	**EC**, Career Services	
			Benefit/Payback Period

	Growth of LIFE House program that focuses on cultural heritage and personal storytelling.*	**EC**, Residential Life	There would be no direct payback for these initiatives, beyond the revenue saved by gaining higher participation in money saving conservation measures.

Rationale

Digital storytelling is a new Internet-based medium that allows individuals to creatively tell their stories using maps, music, video clips, text, and photos. Digital stories could profile sustainability issues where people are from, how those issues connect to this place, debates relating to that issue, and the issues connection to everyday actions could touch on several education objectives at once. A library of such stories could be useful for faculty looking for material to make the issues they are discussing more relevant to students. Stories can also contain links to one another, giving different perspectives on similar issues. Stories could be incorporated into recruiting and help FLC market itself as a "green" college. Digital storytellers could meet and discuss what they learned creating their stories promoting relationships and further discussion.

In a similar vein, hosted gatherings for people to talk about sustainability topics and issues back home with a local sustainability expert would allow for discussion and relationship building. The primary incentive would be a potluck meal. This could also take the form of a larger event with participants rotating between stations where individuals could tell their stories. This could also happen on local field trips to "sustainability sites" close to campus.

A green career fair or career advising sessions on how to connect your interests to sustainability issues would help students think about the connection of sustainability to their future. Career Services and the Environmental Center could work with the different schools to develop tailor-made sessions for science majors, social sciences and humanities majors, and business students.

Finally, LIFE House is a program in its third year and provides students the opportunity to connect their past with sustainability in a community of individuals with similar interests. LIFE stands for Learning to Invest in the Future of the Earth and works with one group of students over an entire year.

The choice of a 10% target is conservative. Ten percent of the population is roughly 450 people. Assuming six field trips a year and ten people on a field trip this would be 300 participants over five years. Assuming not all the trips fill and some participants return for multiple trips we can cut this down to 150 people. Storytelling sessions could net another 150. Digital storytelling and sustainability career sessions would draw in the rest. A green career fair could draw in many people, but would also take special resources to do

well. Working through professors to provide incentives, such as extra credit, for participation would be important. This pre-supposes more attention paid to tracking participation than has been possible in the past.

Other ideas considered: Use of the Old Fort for sustainability education, local recreational trips (e.g. local hiking, walking, biking tours) to create a sense of place, students nominate sustainability heroes from their home town, art wall that allows students to share their stories, creation of a sustainability mentorship program with community members, creation of an alumni sustainability network.

Objective 1.2 Connect every day actions to impacts on the local community and larger world

Potential Indicators	Chosen Indicators
Accuracy of survey answers Accuracy of contest answers Number of students involved in volunteer activities related to sustainability Reduced energy and water-use Decrease in waste; increase in recycling and composting Decrease in drive-alone trips to campus	Accuracy of survey answers Reduced energy and water-use Decrease in waste; increase in recycling and composting Decrease in drive-alone trips to campus

Rationale

The tie between having more information about environmental impacts and behavior change is tenuous. But information can work in concert with other strategies to support behavior change, so measuring the community's knowledge about the positive and negative impacts of our actions is useful. This could be most readily accomplished through the general sustainability survey and focus groups we propose above. Before administering such a survey it would be good to have it go through a review by a professional. We could integrate sustainability into the General Student survey administered by ASFLC. We can then compare this with per capita energy consumption, for example, to try to link the action steps to behavior change.

Targets at Other Schools

UCCS - Awareness objective: Increase percent of students, faculty, and staff with basic awareness of sustainability to 50% (it is estimated that less than 5% of students currently have this awareness) Some actions to achieve this target:

- Sponsor faculty, staff, students, and guest speaker presentations on sustainability topics

- Work with Residence Life and Housing to encourage sustainable living options.
- Install signage that educates about sustainable habits and practices
- Speakers and educational events focused on sustainable practices
- Consider Ecological Footprint tables at University events

UBC - Increase Understanding of Sustainability Inside and Outside the University

Five-year target	Ideas for Action	Responsible Parties	Cost/Resources Needed
Within an annual survey, a 5% annual increase in people who connect everyday actions to the sustainability of the community and world Achieving the performance targets in other sections of the plan will also indicate success.	Messaging on sustainability in high traffic locations, especially in resident halls, campus dining, and computer labs.* Annual trivia contest, game show, and/or scavenger hunt related to sustainability information. Work with student orientation leaders to integrate sustainability into orientation programming* 1-page Sustainability Guide presented to students and conference attendees on check-in Sustainability posters with practical living tips posted in the residence halls.	**Environmental Center** helps specific departments prepare and maintain their own signs and messaging **Environmental Center** in partnership with student affairs and student clubs **Environmental Center**, Student Affairs, Student Housing and Conference Services **Environmental Center** and Student Housing and Conference Services **Environmental Center** and Student Housing and Conference Services	Assuming current staffing levels, the total cost for these actions would be roughly $7,500, but could be funded entirely from cost savings related to energy use. • $5,000 for energy conservation campaign • $1,000 for other signs and material including the 1-page sustainability guide • $1,000 for contest prizes • $500 for res. hall programs In the climate portion of the plan we've proposed that messaging around transportation be funded and staffed separately as part of a beginning transportation demand management program. The web-based energy and water-use displays are planned as part of the performance

	Fun sustainability competitions between resident halls and departments	Environmental Center and Student Housing and Conference Services	contract. Displays in new buildings themselves can be folded into the designs or retrofits.
	Sustainability presentations for resident halls	**Environmental Center** and Student Housing and Conference Services	
	Offer resident hall workshops for RHA group	**Environmental Center** and Student Housing and Conference Services	**Benefit/Payback Period** Resident hall competitions around energy will have a positive return on investment and could subsidize other sustainability education campaigns – including funding a printing and publicity budget for general sustainability education and contest prizes
	Discuss including sustainability as an exposure topic for RAs	**Environmental Center** and Student Housing and Conference Services	
	Develop more bulletin boards for resident halls on sustainability	**Environmental Center**	
	Use new buildings to educate the community about everyday impacts	**Administration**, EC	
	Real-time energy and water-use displays for campus buildings*	**Physical Plant Services**	
	PSAs on KDUR and future FLC television channel	**Environmental Center**, KDUR, and FLC media center	
	Explore a volunteer program that uses Skycard to analyze	**EC**, Auxiliary Services	

	individual impact and provides reward for reaching a certain level of achievement – analyzing paper used, parking pass purchased, local food purchases, going trayless in the dining hall		
	Identify positive incentives for students to participate in resident halls (e.g. free laundry, discount on the meal plan)	**EC** and SHCS	
	Explore eco-rep program through RHA	**EC** and SHCS	

Rationale

There many ways to convey messages around sustainability. Consistent with Environmental Center's focus on positive action we would convey the benefits of doing small things in their day-to-day lives. The cost of not acting is important information to get across, but this must be couched within a positive framework. Messaging with posters, table tents, signs, handouts also goes with objective 3.1 – making sustainability an unavoidable part of the FLC experience. Under this objective we talk about the importance of branding sustainability projects at the Fort. All materials should use the new Pathways to Sustainability logo that creates consistent recognition by the FLC community. We talk more about this under objective 3.1.

Messaging also provides an opportunity to inform people about FLC's progress on specific issues, present issues currently being debated, and pose things such as energy conservation and recycling as a community effort thus reinforcing the other objectives in this section. For example, a message about the pounds of recycling from this year's recycling competition will establish recycling as a positive norm at the College. We can also take advantage of the new media center in the Student Union to get these messages out in new and creative ways. Finally, some of these messages will simply be prompts or reminders, such as stickers by a light switch reminding people to turn off the lights.

Presenting information in imaginative and creative ways is also essential. For example, instead of having a sit-down session during

orientation on sustainability, there should be ways to integrate the information into community building events. We tried to do this last fall with a short ice-breaker that conveyed information about recycling at FLC. This type of activity needs further development. Tying the facts broadcast to the FLC community to an annual fun contest, scavenger hunt, or game show (possibly linked with Snowdown or Homecoming) would provide incentives for committing this information to memory. Such fun events can help build relationships and weave sustainability into the fabric of FLC. Research shows that facts need to be vivid, personal, and concrete to be effective.

Because we have not tracked this information before, we seek a steady upward trend in knowledge about impacts as the primary target. If we are successful, we should also see an increase in sustainability behaviors. The focus of this objective should be the freshman class.

Other ideas considered: Sustainability videos available FLC website, field and service trips emphasizing positive and negative impacts, sustainability kiosk with CD-ROM features, integrate sustainability into the faculty-in-residence program for Animas Hall.

Objective 1.3 Enhance opportunities to incorporate sustainability into the curriculum*

Potential Indicators	Chosen Indicators
Senior seminar projects related to sustainability	Senior seminar projects related to sustainability
Courses engaged in CBLR projects related to sustainability	Courses engaged in CBLR projects related to sustainability
Courses whose content deal with questions of sustainability	Courses whose content deal with questions of sustainability
Use of materials from the EC library for classes	Use of materials from the EC library for classes
Partnerships between the EC and specific courses	Partnerships between the EC and specific courses
Invitations for the Environmental Center to present to classes	Invitations for the Environmental Center to present to classes
End of the semester evaluations at the for every class	

Rationale

The best way to evaluate this objective would be to develop an inventory of the courses that touch on sustainability and do a survey every 2-3 three years. The College is now regularly receiving sustainability surveys from College Guide services and questions relating to curriculum are an important part of the survey. If kept relatively short and presented as another means to collect institutional data rather than an attempt to influence the curriculum, the survey could prove effective. The inventory could touch primarily on course content, CBLR projects and assignments. This would provide a high-level assessment.

The Environmental Center and the Center for Civic Engagement would also look for growth in the number of faculty directly seeking

assistance and the number of student and class projects pursued each year. This would provide a finer grain of detail. In general, however, it would be important to avoid a reporting burden for faculty.

Targets at Other Schools

NAU - Use the "campus as ecosystem" concept across the curriculum to educate faculty and students about the physical, biological, cultural, socioeconomic, and ethical dimensions of sustainability.
CU-Boulder - Provide a basic amount of formal education for all students
Evergreen - Establish a curricular pathway in sustainability
Tufts University - Tufts Environmental Literacy Institute (TELI) – Four-day workshop for faculty to increase literacy related to climate change and climate justice.
UCCS – Has several targets related to formally integrating sustainability into the curriculum:

- Incorporate specific sustainability language into the measurement of the UCCS General Education Core Goal #4, "Students will be prepared to participate as responsible members of a pluralistic society – locally, nationally, and globally."
- Include Sustainability in LAS General Education Requirements
- Strengthen the quality of our Sustainable Development Minor program.

Specific actions related to curriculum:

- Develop Transforming the Curriculum Workshop to further incorporation of sustainability in courseș
- Encourage students to raise sustainability issues in their courses
- Work with Freshman Seminar (FS) program to include sustainability in all FS courses and to have one course that focuses specifically on sustainability
- Encourage faculty to include sustainability topics in their courses

Five-year target	Ideas for Action	Responsible Parties	Cost/Resources Needed
10% of courses touch on sustainability issues through course content, assignments, or CBLR projects	Create a more seamless contact and referral system for faculty interested in pursuing CBLR projects related to sustainability	Center for Civic Engagement, Environmental Center	As much of this work is already happening, the College could pursue these initiatives with little to no cost. This assumes currently staffing levels for the Center for Civic Engagement and the Environmental Center. The most costly aspect of this
Double the number of classes engaged in CBLR projects related to sustainability	Cultivation of sustainability-related CBLR projects with seemingly unrelated	Center for Civic Engagement, Environmental Center	

25% increase in senior seminar projects related to sustainability Triple the use of the EC library for class assignments Two ongoing partnerships between Environmental Center programs and specific courses Ten class presentations a year by the Environmental Center	departments (Modern languages, Music, etc.) Increase the presence of sustainability in the CBLR Showcase Use of the Old Fort as a resource for learning about sustainability Ensure there is a learning community program related to sustainability Development of sustainability study guides Develop ongoing partnerships between Environmental Center programs and specific courses, at least one within SOBA Connect sustainability on campus to Leave No Trace ethic in the backcountry Identify and publicize sustainability related study abroad opportunities	 Center for Civic Engagement, Environmental Center Old Fort Task Force Environmental Center, Learning Community program Environmental Center, Reed Library Environmental Center **EC**, OP Environmental Center and International Programs office	objective would be the evaluation and the tracking. **Benefit/Payback Period** The benefit of these actions would come in: • Meeting the goals in the current strategic plan related to CBLR • Support given to faculty • Additional labor for sustainability projects by having courses assist with on-campus projects • Ability to document and market how we are addressing sustainability within our curriculum. There is no direct financial benefit.
Rationale All of the action items exist in some form already. The Environmental Center and the Center for Civic Engagement are already in			

close communication about how to coordinate their efforts. This will receive further elaboration in the portion of the plan devoted to service. There is already a CBLR showcase for student projects. A task force to evaluate uses of the Old Fort has already convened and sustainability is a central topic in these discussions. There is already a learning community program for incoming students related to sustainability. The Environmental Center has discussed the creation of study guides with Reed Library, making the resources in both locations more accessible. And the EC has already partnered with the *End of Oil* class on numerous projects. Additional long-term partnerships could support the EC's various program areas: Media and Communications, Education and Outreach, Local Food, and Zero-Waste. Class partnerships also could provide people to revive the EC's habitat conservation and sustainable business programs. The EC already possesses a list of environmental study abroad programs in developing countries.

With forethought these actions could help achieve several other objectives in this section. For example, CBLR projects help to build relationships and connect students and faculty with individuals and organizations. They also provide an opportunity to educate about the impacts of everyday life and provide updates on what FLC is doing around specific issues. If framed properly, these actions can spur debate and classes can directly involve students in sustainability projects and planning.

We do not currently track the data related to this objective, but we believe the stated targets are achievable given our experience on campus.

Other ideas considered: Conferences that connect sustainability and the curriculum, general education requirement related to sustainability, money to allow small groups of faculty to coordinate class projects around a particular sustainability topic, further development of innovative month programs related to sustainability.

Goal 2: Make Sustainability a Community Effort

Objective 2.1 – Use sustainability to strengthen the sense of community and common purpose at Fort Lewis College*

Potential Indicators	Chosen Indicators
Surveys for students in sustainability projects that have positive responses on questions about relationship-building and friendship-making Number of students that continue to collaborate on other sustainability projects together Number of students retained for future sustainability projects % of sustainability events and projects involving collaboration	% of sustainability events and projects involving collaboration between different groups on campus Number of students that continue to collaborate on other sustainability projects together

between different groups on campus	

Rationale

Students that feel they are part of a community are more likely to return and be a part of other sustainability projects because the sustainability projects are directly correlated to their sense of community and belonging. Additionally, students that feel like they have built a strong community through the sustainability projects will want to continue working with similar people.

Targets at Other Schools

UCSB - Ecological Coalition (E-Coalition): a network for campus-based environmental, ecological, and sustainability-oriented groups

Five-year target	Ideas for Action	Responsible Parties	Cost/Resources Needed
25% of sustainability events and projects generated at the grassroots level involve two or more FLC partners At least five events involve organizations that partner more than once.	Create a "sustainability events fund" that supports clubs and departments collaborating to put on events related to sustainability Campus sustainability festival that helps to match groups and individuals that pursue collaborative projects related to sustainability* Hold forum on approaches to sustainability by indigenous cultures Explore creating a freshman sustainability project, similar to	**Environmental Center**, FAB **Environmental Center**, The Leadership Center Environmental Center, Native American Center, **Native and Indigenous Studies Program** **EC**, Student Affairs	Total to implement these ideas would be $10-15,000. Events fund - $10,000 ($2,000 per year for five years) – this could be an allocation within this account. Alternatively, this could receive separate funding from grants or alumni contributions Campus sustainability festival – Funding for such an event could come from an events fund or outside grants. The exact cost of the event would depend on the format. **Benefit/Payback Period**

	the FOOT program Ideas mentioned elsewhere that contribute to this objective include: sustainability contests, storytelling sessions, field trips, expansion of LIFE program, sustainability service days, sustainability projects fund, SAP implementation groups		There would be no payback on these events, though if the events, such as the festival, prove large enough, a portion of the costs could be made back through sponsorships and donations.

Rationale

An event fund can help build relationships on two levels. First, the guidelines for using the funding would favor collaboration between groups. Second, the guidelines could also favor events that are interactive and encourage community building. Finally, groups seeking funding would need to demonstrate a connection to sustainability. FAB could administer the fund. This would promote more discussion and thinking about sustainability within these groups.

For the sustainability festival, we propose an event that results in ideas for collaborative projects between departments and/or student organizations. One possible format would be a World Café that promotes conversation, dialogue, and mutual learning on a specific topic of interest. Attending the event could raise money for participating organizations, while additional funding would be available for the collaborative projects resulting from the event. Projects with more collaborating groups would receive more money. Other formats and structures are also possible depending on the available funding. The recent Buffalo Feast attended by large numbers of people provides an example of the type of event that can bring people together and reinforce what people appreciate about the College.

Members of PACEA noted that this section of the action plan should include education about indigenous worldviews.

Other ideas considered: Create outside spaces where people can gather around native plantings or gardens, having faculty, staff or older students serve as sustainability mentors, money to allow small groups of faculty to coordinate class projects around a particular sustainability topic.

Objective 2.2: Increase participation in sustainability project planning and implementation

Potential Indicators	Chosen Indicators
Web traffic on the sustainability involvement web page Number of FLC people that subscribe to the sustainability involvement list serve Participation in sustainability service days Number of FLC people and organizations that plan and implement sustainability projects and events Number of students in leadership positions in sustainability projects and events	Web traffic on the sustainability involvement web page Number of FLC people that subscribe to the sustainability involvement list serve Number of FLC people and organizations that plan and implement sustainability projects and events Number of students in leadership positions in sustainability projects and events
Rationale Each of the indicators shows slightly more involvement in implementing sustainability on campus. This would require more careful recordkeeping of participation and involvement, but is certainly possible with current resources.	

Targets at Other Schools

UCCS - Involvement Objective: Increase involvement of faculty, staff, and students in sustainability initiatives on and off campus
- Create partnerships between faculty and operations staff to conduct sustainability projects with students
- Publicize opportunities for students to conduct research in sustainable operations
- Create sustainability award to be included in campus awards ceremony
- Create Pledge for Sustainability - get campus community to sign - consider matching with funds for investment in sustainability efforts

CU-Boulder - promote environmental stewardship and sustainability practices among all members of the campus community
University of Victoria – Subject specific task forces to make recommendations
Stanford – Cross-departmental working teams and committees to monitor progress related to sustainability
Colorado College - Ecofund: Grant money to fund sustainability related projects
CSU - "Student Opportunities" section very short-term project oriented: "Great Sofa Round-up," "Leave-it Behind Program"

Five-year target	Ideas for Action	Responsible Parties	Cost/Resources Needed
Increase from baseline in: • the number of FLC people and organizations involved in planning and implementing sustainability projects and events • the number of students in leadership positions in sustainability projects and events • the number of FLC people that subscribe to the sustainability involvement list serve • web traffic on the sustainability involvement web page	Fund sustainability projects that get student groups to collaborate Organize sustainability service days, such as a regular river clean-up, that bring people together Create a central web portal for sustainability involvement, coordinated with a list serve of potential volunteers* Have an annual sustainability awards ceremony Have a board for sustainability-related postings in a central location in the new student union SAP implementation groups	**FAB**, EC Center for Civic Engagement, **Environmental Center** **Campus Sustainability Officer**, Environmental Center, IT **Campus Sustainability Officer**, PACEA **Facilities scheduling** **Campus Sustainability Officer**	Funding the sustainability projects fund would come from the sustainability fee imitative passed in 2008 Alternatively, this could receive separate funding from grants or alumni contributions $500-$1000 in staff time is necessary to develop the sustainability involvement web portal. Staff time would be needed to maintain it, though much of this could be automated. The cost of an awards ceremony can range from $500-$5000, depending on the level of catering and awards for the recipients. **Benefit/Payback Period** The projects fund can generate savings that goes to replenish the fund over time. Beyond this, however, there is no direct payback for these initiatives.

Rationale We propose capturing general sustainable behavior, such as recycling rates, in the general sustainability survey proposed above. This objective is focused on increasing participation in planning and implementation of sustainability initiatives. Our hope is to broaden and deepen participation at this higher level. The diverse actions we have chosen address this objective from different angles. Service days, posting board, and the web portal/list serve encourage volunteers. The project fund and SAP implementation groups (which we assume will exist in some form) focus on project planning. The sustainability awards ceremony can generate social recognition for sustainability leadership on campus. *Other ideas considered:* Have people earn "patches" or "badges" for assisting with different topics (climate badge, local food badge, etc. – similar to the Boy Scouts). If they earn all the badges they get a larger prize. Another idea is "Do-It-Yourself" workshops with very practical things, such as planting herbs or building a bird house.

Objective 2.3 Create and Maintain an Open Dialogue Surrounding Sustainability Issues*

Potential Indicators	Chosen Indicators
Number of events that promote conversations about sustainability Posts on the Environmental Center's blogs Number of opinion pieces on sustainability in campus media Attendance at events devoted to debate and dialogue about sustainability topics. Letter/messages to sustainability advice column	Posts on the Environmental Center's blogs Number of opinion pieces on sustainability in campus media Attendance at events devoted to debate and dialogue about sustainability topics Letter/messages to sustainability advice column
Rationale These are fairly straightforward measures of campus dialogue. The focus in the action items below is to set up the structures (e.g. blog, advice column) that can help meet the objective and provide a means for measurement	

Targets at Other Schools
Middlebury - Weekly Colloquium Series on conservation and environmental topics

Five-year target	Ideas for Action	Responsible Parties	Cost/Resources Needed
Annual increases in: • Blog posts • Opinion articles submitted to campus media outlets • Attendance at events devoted to dialogue and discussion • Letters/messages to Sustainability Advice column	Sustainability arts fund for visual and performing arts projects that can generate dialogue and debate about sustainability issues.* Brown bag lunch series on sustainability debates. Call-in radio show focused on sustainability debates* Sustainability Advice/Info column with write in questions ASFLC Candidates Forum on sustainability Use public lands issues to spark dialogue and debate about sustainability Ideas mentioned elsewhere that contribute to this objective include: digital storytelling and storytelling sessions, field trips, and expansion of the LIFE program, forums on indigenous perspectives on sustainability	Art, Theater, Music Departments, **Environmental Center**, interested faculty **Environmental Center**, Environmental Studies program **Environmental Center**, KDUR **Environmental Center** **Environmental Center**, ASFLC **OP**, EC	A minimum start up for the arts fund would be $1000/year. Many environmental art installations are inexpensive. Alumni gifts could grow this fund over time. Collaborations with the Durango Arts Center and Music in the Mountains could enhance these projects and their presentation. The other action ideas could take place at little-to-no cost. **Benefit/Payback Period** There would not be a payback for this money, but the art program would be unique and very popular on campus and in the community.

Rationale

Many of the ideas for action in this section can generate dialogue and debate about sustainability. Using the arts to spark debate and discussion is in the best tradition of the liberal arts education and is most applicable to this specific objective. The other four suggestions are to create venues where this debate and discussion can occur. The EC already maintains a blog and produces an online magazine that can also provide an outlet for discussion. It would be necessary to start tracking blog posts and opinion articles in a more systematic way.

Other ideas considered: Creation of a blog focused on sustainability debates, connecting faculty and staff with national and global sustainability list serves to keep information current, poetry slams on sustainability

Goal 3: Increase the visibility and transparency of sustainability efforts

Objective 3.1: Make sustainability an unavoidable part of the Fort Lewis experience

Potential Indicators	Chosen Indicators
Amount of bottled water used for catered events	Amount of bottled water used for catered events
# of requests to catering for local food	# of requests to catering for local food
# of requests for to have recycling/composting/zero-waste events	# of requests for to have recycling/composting/zero-waste events
Amount of trash collected during regular campus clean-ups	Amount of trash collected during regular campus clean-ups
Amount of sales of FLC sustainability accessories (re-usable bags, mugs, stickers, etc)	Amount of sales of FLC sustainability accessories (re-usable bags, mugs, stickers, etc)
Visibility of sustainability on the FLC website	Visibility of sustainability on the FLC website
Number of people that take info attached to posters	Number of people that take info attached to posters
Number of people that respond to incentives (free popcorn, etc.) that are placed at the end of e-mails, on bulletin boards, etc.	Number of people that respond to incentives (free popcorn, etc.) that are placed at the end of e-mails, on bulletin boards, etc.
Spot survey responses on sustainability initiatives	Spot survey responses on sustainability initiatives
Number of FLC people that subscribe to the sustainability involvement list serve	Number of FLC people that subscribe to the sustainability involvement list serve

Rationale

This aim of this objective is visibility of both a sustainability ethic among the FLC population and of the specific projects and initiatives that FLC is taking on. Visibility is not difficult to measure since the number of posters, fliers, and other collateral around campus is easily counted. What is more difficult is the amount of attention people lend to this "green media." Are people paying attention or does it just fades into the background? The indicators we have chosen try to uncover this deeper aspect of the objective:

- Choices of FLC community members relative to their events reflect the relative importance of sustainability just as the amount of litter on campus reflects the regard people feel for their immediate environment
- The use of sustainability accessories, such as a re-usable bag, reflect a personal choice
- People who take cards attached to the bottom of posters or who respond to incentives attached to the end or the middle of emails show that people are reviewing the material
- Spot surveys about FLC sustainability initiatives are a good check on visibility of the projects
- Subscriptions to list serves reflect a choice to receive information

Targets at Other Schools

UCCS – Action step: Increase visibility of sustainable campus operations initiatives through newsletter, website, and signage
Tufts - The Solar Decathlon is a biennial competition in which 20 teams of university students compete to design, build, and operate the most attractive, effective, and energy-efficient solar-powered house.
CSU - CSU - A link for "The Green University" off of the main page

Five-year target	Ideas for Action	Responsible Parties	Cost/Resources Needed
Upward trend in the listed indicators	Use the new Pathways to Sustainability logo to brand sustainability efforts on campus.* Have a link for FLC's Sustainability Initiatives on the main page of the website and facilitate development of	**Environmental Center**, FLC Foundation, Enrollment Services, Campus Sustainability Officer Environmental Center, IT, Enrollment Services, **Campus Sustainability Officer**	Staff time is required to develop a brand and work on the website. The cost of a campus sustainability festival depends on its character. The last two years there has been the Loco-Local Bazaar on campus in the

	sustainability portals for prospective students Campus sustainability festival that helps to match groups and individuals that pursue collaborative projects related to sustainability* Create a student-driven, marketing strategy for sustainability across campus Integrate sustainability criteria into the purchasing system Make fuel efficient or alternative fuel vehicles in the FLC fleet highly visible. Ideas mentioned elsewhere that contribute to this objective include: sustainability arts fund, sustainability events fund, messaging in high traffic locations, integrating sustainability into new student orientation, 1-page Sustainability Guide, real-time energy displays, and PSAs on KDUR.	**Environmental Center**, SPC, Leadership Center **Campus Sustainability Officer**, Environmental Center **Environmental Center**, Purchasing, IT Physical Plant Services	fall. Students have in mind something similar, roughly on the scale of Skyfest. **Benefit/Payback Period** Having sustainability projects and a sustainability ethic more visible on campus will make the rest of the plan much more effective, but there is not a direct financial return.
Rationale In discussing this objective, we discovered that Fort Lewis is likely different from other schools in how we pursue sustainability.			

Students shared their thoughts about FLC's current identity and how this relates to sustainability. We felt that developing a positive brand for FLC with an explicit connection to sustainability is critical. The key question in developing this brand is "What do people really appreciate about FLC?" Our students offered some ideas, and the idea for an annual event grew from this discussion. The desire is to create an event that expresses this positive identity. There is a great deal of overlap with the other objectives listed in this section. *Other ideas considered:* Traveling waste and recycling show with a before and after quiz

Objective 3.2: Improve access to progress and decision-making related to sustainability

Potential Indicators	Chosen Indicators
Suggestions or comments on sustainability decisions	Suggestions or comments on sustainability decisions
Number of items brought to PACEA for consideration	Number of items brought to PACEA for consideration
Web traffic on page devoted to sustainability reporting	Web traffic on page devoted to sustainability reporting
Number of students that attend open forum/town hall	Number of students that attend open forum/town hall
Ratio of students to staff/faculty on each sustainability project's planning committee	Ratio of students to staff/faculty on each sustainability project's planning committee
Rationale The best measure of accessibility of information is whether people are accessing it. We have tried to identify indicators that will show whether people are seeking out information about our progress as an institution. These indicators range from web traffic to items brought before PACEA to attendance at yearly reporting sessions. Student involvement on planning committees is also essential to create access to the decision-making process since other students can communicate directly with them.	

Five-year target	Ideas for Action	Responsible Parties	Cost/Resources Needed
Upward trend in each of the indicators listed above	Establish a mechanism for FLC community to put issues on the agenda for PACEA and PACEA minutes publicly available* Publicize clear instructions on available channels to provide	**PACEA** Environmental Center, **Campus Sustainability**	The total for these actions would be approximately $500 each year. This would cover a snack buffet for the town hall and printing copy costs for the general sustainability survey. Staff time would also be

	feedback and influence decisions Post regular updates on sustainability decisions on the sustainability involvement page of the FLC website. Include a place on the page to send comments Conduct an annual general sustainability survey to collect perceptions and ideas Progress reports scroll on FLC television station or information kiosk or website* Sustainability Suggestion Box Hold an annual sustainability town hall/public forum that allows for progress reports to the FLC community and that encourages discussion, feedback, and idea generation*	**Officer** **Campus Sustainability Officer** **Campus Sustainability Officer** **Campus Sustainability Officer** **Campus Sustainability Officer** **Campus Sustainability Officer**	necessary to plan the public forum/town hall and organize the sustainability survey. Plans for these initiatives will be addressed further in the Coordination and Support section of the plan **Benefit/Payback Period** The primary benefit is in having a more engaged student body that improves the quality of life and learning on campus. There is no direct financial payback.
Rationale These actions will provide for a consistent flow of information between decision-making bodies at the College and the larger campus community. These channels of communication need to be well-publicized. This is an essential part of connecting the institutional and grassroots levels illustrated in the model and will be explored more fully in the implementation section of the action plan.			

Goal 4: Provide a means to translate ideas and interest into effective action

Objective 4.1 - Connect motivated individuals with helpful individuals and organizations

Potential Indicators	Chosen Indicators
Number of project-related referrals Number of successful projects resulting from the initial contact Overall increase in student participation in sustainability projects Number of faculty and staff who list their interests with the Environmental Center Popularity of the green pages/resource guide	Number of project-related referrals Number of faculty and staff who list their interests with the Environmental Center

Rationale

The goal with this objective is to create an effective referral service that results in successful on-the-ground projects. Whether a project is successful depends, however, on a number of factors beyond the initial referral. Given this, we have chosen two easy to track indicators. We can combine these indicators with the indicators for objective 4.2 to gain a more complete picture of our progress toward Goal 4.

Five-year target	Ideas for Action	Responsible Parties	Cost/Resources Needed
From a baseline measure, an annual increase of 5% in the faculty and staff participation in a campus-wide referral system related to sustainability From a baseline measure, an upward trend in the number of project-related referrals.	Create a more seamless contact and referral system for individuals with an idea or interest related to sustainability Inventory interests of faculty and staff related to sustainability Use the EC database or other	**Environmental Center**, Center for Civic Engagement **Environmental Center** **Environmental Center**	Assuming current staffing levels for the EC, the only cost for the listed actions would come in creating the Green Pages or Resource Guide. We believe grant money is available to pay for printing costs **Benefit/Payback Period**

	networking software (e.g. Facebook) to catalogue and match people with similar interests Partner with local groups to produce a La Plata County Green Pages/Resource Guide*	**Environmental Center**	The benefit of these actions would come from more successful projects at the grassroots level and a reduction in duplication.
Rationale The actions listed above are already underway. The Environmental Center database already has the ability to catalogue individual's interests. The EC and the Center for Civic Engagement have already discussed ways to streamline referral services related to sustainability. A La Plata County Green Pages is already half complete. The Environmental Center is working on this project with the Sustainability Alliance of Southwest Colorado on this project.			

Objective 4.2: Provide guidance and resources for grassroots initiatives

Potential Indicators	Chosen Indicators
Successful student initiated projects (from beginning to completion) Applications for funding for sustainability projects Overall increase in student participation in sustainability projects	Successful student initiated projects (from beginning to completion) Applications for funding for sustainability projects
Rationale The college can track the number of successful projects initiated and completed at the grassroots level. This is really the most direct indicator available to us. Applications for funding are another good indicator and suggest that the resources provided for sustainability are useful and in demand.	

Five-year target	Ideas for Action	Responsible Parties	Cost/Resources Needed
Upward trend in the two indicators listed above.	Provide training sessions for students in grassroots organizing with specific sessions on facilitation, outreach, marketing, fundraising, and project management	**Environmental Center,** The Leadership Center	Assuming current staffing levels for the EC, the only cost for this objective would be tied to providing seed money for pilot projects. The new sustainability fee will provide a small amount of money. This could be supplemented with grants and alumni gifts.
	Host brown bag sessions profiling case studies of grassroots organizing	**Environmental Center**	**Benefit/Payback Period**
	Provide a means for students working on grassroots initiatives to support each other	**Environmental Center**	Some of the pilot projects could provide a return on investment. The real return would come from successful projects, engaged students, which we assume will lead to higher retention rates.
	Match students with informal faculty and staff project advisors/mentors*	**Environmental Center**	
	Provide training to faculty and staff serving as advisors/mentors so they understand the resources available to students*	**Environmental Center**	
	Provide start-up funding for pilot project initiated at the grassroots level*	**Environmental Center**, FAB	

Rationale

This objective speaks directly to capacity-building. The Environmental Center currently serves this role on campus, but the target and action ideas can sharpen the Center's focus and make it more effective. For training sessions, the Center can work with other departments on campus and community groups. The Center will have ongoing projects through which students can receive guidance and training. These students can then be a resource for other students who cannot work for the Center or whose project doesn't fit with its current focus.

Recruiting staff and faculty to serve as informal advisors and mentors will involve more of campus in this endeavor. Training for these mentors would focus on the resources available for students and the pathways available for engaging the institutions. Creative incentives and small rewards can help encourage our busy faculty and staff to help out and will validate their skills and expertise.

Start-up funding can be available through the various funds described in the section: small event grants, project grants, research grants, and arts grants can provide opportunities for students to get started. Part of the training provided can be how to leverage these funds for additional fundraising. In the future, some funds might be available through the Environmental Center's affiliation with the SEEDS program, a project of the Ecological Society of America. Professors could integrate grant writing into their classes to take advantage of these small funding streams.

Section Title – Service to Region

Context & Current Situation

Service to Region is Strategic Direction three of the current FLC strategic plan. The overview to this section of the FLC strategic plan states "In the 21st century, it is essential that a college be aligned with the region it serves in terms of economic and social development. With Fort Lewis College situated in a small town of 15,000, the intellectual and applied knowledge offered by its faculty, staff and students must have a positive impact on the city and county. In addition, to add distinctiveness to Fort Lewis College as a national leader in liberal arts education, we seek to have all of our students civically engaged so that they can learn to be active citizens and understand the realities of 'giving back'."

One of the questions each sustainability study circle considered last year was how Fort Lewis could serve the region in relation to issues such as energy, transportation, and environmental health. A plan for community outreach and partnerships around climate and sustainability issues is a required by the President's Climate Commitment. Community connections are also an important component of the Association for the Advancement of Sustainability in Higher Education (AASHE) campus sustainability rating system.

La Plata County is currently awash in sustainability initiatives and organizations addressing sustainability issues and topics. The recently released strategic plan for the county has sustainability as a primary concern. Similarly, the City of Durango has recently created a Department of Sustainability Services to lend focus to its various efforts. Within individual topic areas such as energy, transportation, and food there are clusters of organization working sometimes together and sometimes in isolation. The lack of coordination and communication between these groups remains a problem. This, therefore, represents both an opportunity and a constraint. There is great opportunity for Fort Lewis to connect with the community, but the radically decentralized nature of sustainability projects in the region dissipate the potential impact of this work.

The Environmental Center is in a good position to facilitate connections between campus and the community. In many ways the EC is the "eyes and ears" of the college with respect to these issues and making these connections is a primary focus of the EC's new mission statement. Despite this designated role, the Center often finds out about connections between individual classes and sustainability-related groups that are happening independently. The Center's limited staffing and its other functions as a student leadership program, a campus sustainability office, a community resource center, and an academic support center related to environmental issues limit the amount of time and energy that can be devoted to facilitating partnerships or even promoting this potential role to the rest of campus.

At the same time, the Center for Civic Engagement has crafted its own plan for how to achieve the foundational actions and institutional targets set for by the FLC strategic plan. The EC and the CCE have discussed the potential for the theme of sustainability to serve as a test case for other cross-departmental CBLR themes. An important partner is the Environmental Studies program, which includes a community internship requirement, a group community-based research course, and a requirement for a senior seminar that in most cases will result in community-based study.

Many people have stated that Fort Lewis can serve the region best by being a role model with regard to sustainable practices. This belief, while completely valid, turns the focus back toward campus and its internal operations. In additional to strong performance, to be an effective demonstration site the College must also invest in sharing its successes and lessons learned with the larger community. Beyond the Environmental Center's list serve, there is no organized means to share the College's practices.

The primary implementation issues related to service to the region around sustainability have to do with coordination. Currently the Environmental Center and Center for Civic Engagement are available to assist individual students and faculty members in connecting with community groups. But often these connections occur through individual initiative. While this prevents bureaucracy, it can make it more difficult for the college as a whole to make an impact as individual projects and initiatives might not take into account everything that is happening in the community around a particular issue or miss existing partnerships that already exist, such as with the Environmental Center. Some way to improve coordination and oversight, while maintaining the flexibility for individual students and instructors to craft partnerships that serve specific academic goals is necessary. Another question is whether there are any criteria for what constitute appropriate or inappropriate projects for the College to engage in. If the College decides to define a more specific initiative aimed at sustainability within the service section of the strategic plan, what constitutes appropriate oversight?

Key opportunities then include the abundance of sustainability initiatives being pursued within the community, the relationships developed by the Environmental Center with community organizations, the importance of service in the current strategic plan for the College, and the growing focus of City and County government on sustainability issues. Key constraints include the current lack of communication and coordination between community groups that hinder effectiveness. There is clearly a great deal of overlap with other sections of the Sustainability Action Plan, especially the Education and Engagement section. The goals and objectives below, however, attempt to bring greater focus and clarity to the task of serving the region.

Students from the Honors 220 class crafted the following vision related to service to the region on sustainability issues:

Strategic Direction: *Fort Lewis will be a source of innovation and best practices and will actively collaborate with communities across the region to identify and address issues related to sustainability.*

Goals & Objectives

Goal 1: Be a source for sustainability research and training for the Four Corners region

1.1: Provide community education and training opportunities related to sustainability
1.2: Find and pass on innovative solutions to sustainability challenges

Goal 2: Participate in local, regional and state partnerships that further sustainability

2.1: Assist youth from the region in crafting a sustainable future for their communities*
2.2: Leverage the purchasing power of the College and its community members to further sustainable economic development within the Four Corners region
2.3 Contribute to the public policy decisions that support sustainability

Goal 3: Use the theme of sustainability to further community-based learning and research on campus

3.1 Provide a more comprehensive and efficient system to match campus resources with community needs and interests
3.2 Help students, staff, and faculty make substantive, hands-on contributions to sustainability projects across the region*

Rationale

We have chosen these goals and objectives based on a review of the ideas generated by the 3-2-1 study circles during the spring of 2008, the CBLR strategic plan, similar work at other schools, and the credits within AASHE's developing campus rating system. The intent is to build off of existing planning efforts and avoid creating parallel structures that would duplicate the work of the Center for Civic Engagement. For example, the strategic plan already targets job creation and the economic impact of the College, and there is already a sub-committee for the CBLR initiative looking at ways to engage K-12 youth. Potential funding would be available for many of the actions steps through grants that Center for Civic Engagement and the Environmental Center are currently seeking.

In discussing this section of the plan students wanted to emphasize practical, hands-on projects that allow for the application of what they are learning in class. Much of the actual work for these objectives revolves around setting up monitoring and tracking systems and establishing a baseline of data. This requires significant staff time but does not require a large amount of capital. For this reason, most of the targets below simply list upward trends for the chosen indicators.

Note that the names that appear in **bold** are the parties that would have primary responsibility for the listed action item. Other names listed would be involved in the planning or implementation.

Goal 1: Be a source for sustainability research and training for the Four Corners region

Objective 1.1: Provide community education and training opportunities related to sustainability

Potential Indicators	Chosen Indicators
# of community programs related to sustainability Attendance at education and training sessions Evaluation of the opportunities that do exist	# of community programs related to sustainability
Rationale Nobody has ever tallied the number of community events related to sustainability on campus and so no baseline exists for this objective. Attendance could be a measure of how many people the program actually reach. But this would present more of a tracking burden for the College. The public calendars are unlikely to record every event or opportunity that exists. Working this question into the annual report of each department would make tracking progress much easier	

Current Situation at FLC	Targets at Other Schools
Each year a number of departments sponsor education programs and presentations related to sustainability. The Environmental Center regularly hosts speakers and films throughout the year and puts on its annual Earth Week celebration in the spring. Other departments and student organizations host events as well. Trainings are less frequent. Perhaps the most notable training is the Southwest Design Academy, co-sponsored by the San Juan Institute, housed at the College and the County.	Colorado College - Energizing Colorado Springs initiative brings people together to learn how, through their efforts, we as a nation can live more efficiently and sustainably. College of Marin – Opened a water education and technology center. NAU - The Institute for Tribal Environmental Professionals (ITEP) has worked since 1993 with tribes, the EPA, and other

	Federal agencies to assist tribes in developing their environmental capacity. ITEP programs consist of the following: Air Quality Training, Environmental Compliance Inspection Training, Environmental Education and Outreach, Professional Assistance Program, and Tribal Solid Waste Education and Assistance Program. NAU - Project WET (Water Education for Teachers) provides teacher training on lessons about Arizona's water resources.

Five-Year Target	Actions to Achieve Target	Responsible Parties	Cost/Resources Needed
Increase from baseline of ten percent in the overall total number of public programs related to sustainability	Conduct an inventory of public programs related to sustainability Identification of the most important areas for the College to provide education and training Increase courses in continuing education related to sustainability Create a sustainability section in the Continuing Education catalog Explore compensation for organizations and individuals in the community – incentives, honoraria, fee-for-service – so	**Environmental Center**, Center for Civic Engagement **Environmental Center**, Center for Civic Engagement **Continuing education**, Environmental Center **Continuing education**, Environmental Center Environmental Center, **Center for Civic Engagement,** Continuing Education	There are no capital costs associated with these action items. Each action takes time, but would overlap with other duties outlined in the education portion of the plan. **Benefit/Payback Period** The primary benefit is in tracking and marketing public programs touching on sustainability as one initiative. If this coordinated marketing can be effective it will make our efforts in this area more visible. It will also encourage departments to think about how their public programs (e.g. art shows, performances, science presentations) are connected to sustainability.

	we can develop a more expansive version of regional education		
	Have FLC students provide education and training related to sustainability for K-12 students	**Environmental Center**, Adventure education, Teacher Education, Center for Civic Engagement	
	Get departments most directly connected to sustainability to understand and serve the community's needs with regard to education and training	**EC**, CCE, Academic departments	
	Work with tribes to secure grant funding for training Native American students to become sustainability professionals	EC, **CCE**, Native and Indigenous Studies Program	
	Seek grants to compensate FLC staff and faculty who plan or lead an education or training session	EC, **CCE**, Academic departments	
	Identify and market particular programs as "sustainability events" with a distinctive logo.	**EC**, IT, Continuing education	
Rationale To gauge "relatedness" to sustainability we will look at the goal statement for the course or program, along with the course title,			

description, and content. We suggest setting some basic parameters, perhaps with guidance from AASHE, but leaving room for instructors or departments to make a case for including their program in the inventory. Ideally, their program would benefit from some additional promotion. Deciding what "counts" for sustainability is a good debate to have and will serve to raise awareness.

Specific issues mentioned during the study circles include: raising awareness about sustainable transit, connecting water and land-use, helping people understand our place within the Colorado River system, and training in sustainability agriculture. Fort Lewis already does many of these things to some degree. Without a baseline it's difficult to specify a target. Setting up a system to get and update a tally of programs would be an important accomplishment. In order for the last action item to work, the College should provide some additional promotion, perhaps on the "sustainability portal" that would encourage organizers to describe how their program connect with sustainability.

Other ideas discussed: Assisting with community education about zero-waste, holding water forums, writing a series of articles in the *Good Earth* section of the Durango Herald, assisting local producers with organic certification, partnering with La Boca Center for Sustainability on an agroecology certification program.

Objective 1.2: Find and pass on innovative solutions to regional sustainability challenges

Potential Indicators	Chosen Indicators
dollars spent on research related to sustainability # of solutions traced back to student and faculty research activities % of faculty engaged in sustainability research % of departments engaged in sustainability research % of total research projects related to sustainability	% of faculty engaged in sustainability research % of departments engaged in sustainability research % of total research projects related to sustainability

Rationale

The AASHE's STARS rating system requires an inventory of research projects on campus. The Environmental Center could add this to the course inventory proposed in the Education and Engagement section. Doing such an inventory is a large undertaking and perhaps could be automated to reduce the reporting burden for faculty.

Each of these three indicators is easy to calculate once an inventory of research is complete. While AASHE gives credit for funding for sustainability research, large grants could skew targets. While "related to sustainability" is broad, this can promote discussion

about what sustainability research entails. In the future, organizations such as AASHE might be specific about what constitutes sustainability research, but at this point, they too are keeping this definition broad.

Current Situation at FLC	Targets at Other Schools
Many faculty members pursue research related to sustainability, though we do not have a comprehensive list of all the projects currently underway. The heavy teaching load makes pursuing research challenging. Students at the Environmental Center research answers to practical problems such as composting and campus behaviors and attitudes. Other students do research for their capstone courses and senior seminars. Understanding opportunities to connect research at the College with community needs is a priority under the EC's new mission statement.	University of Victoria - Pacific Institute for Climate Solutions (PICS) will bring together top scientists, government and the private sector to develop innovative climate change adaptation and mitigation solutions.

Five-Year Target	Actions to Achieve Target	Responsible Parties	Cost/Resources Needed
Increase from baseline of ten percent in the number of research projects related to sustainability	Conduct an inventory of sustainability-related research on campus	**Environmental Center**, Center for Civic Engagement	All of the action items listed can occur without additional funding from the College, but all would benefit from outside grants to allow for materials, student stipends and pay for course release time. The EC and CCE can work with academic departments to seek funding for specific projects and partnerships
	Identification of the areas that research from students and faculty can have the most impact.	**Environmental Center**, Center for Civic Engagement	
	Seek grant funding to start an incentive program for faculty to pursue research related to regional sustainability	**Environmental Center**, Center for Civic Engagement, academic departments	
	Create a sustainability research web page off the proposed portal where results of research	**EC**, IT, Academic departments. Reed Library	**Benefit/Payback Period** These actions can boost the profile of the College and help expand the CBLR program.

	are accessible to the public. Assess the best way to align the Sustainability Action Plan with Tribal College sustainability initiative Utilize the Old Fort property to demonstrate sustainability practices and self-sufficiency.	 **EC**, NAIS **Old Fort Task Force**, Faculty	Marketing these types of hands-on opportunities can help with recruitment and retention.

Rationale

Again, without a baseline it is difficult to gauge appropriate targets. Easy ways to track sustainability research would be through the grants office and by looking at the projects funded by the Undergraduate Research Program. Tracking the results of the research would be more time consuming, though they would have a home in the Environmental Center library. The listed action items are broad statements of the themes that came from the study circles related to research. Areas for productive research that study circles identified include:

- Partner with 4CORE on research that supports the city/county climate action plan.
- Work with Region 9 and other groups to conduct research on the potential to expand the green economy
- Research innovative ways to re-use waste products (e.g. composting, vegetable oil)
- Research sustainable agriculture techniques to boost food production in the Four Corners
- Work with state and federal agencies on sustainable land management and restoration strategies for wild land.

Use of the Old Fort for sustainability-related research hold special promise and was identified as a priority. The agriculture and engineering programs are already working on these action steps with small projects. SOBA classes have done marketing studies in the past on topics related to sustainability and the Old Fort Task Force is already discussing ways to advance sustainability on the Old Fort property.

There might also be opportunities to team with the Environmental Studies program or Reed Library to have research posted online.

Other ideas discussed: Use non-lethal, non-toxic means to manage wildlife populations, investigate regional composting opportunities, demonstrative innovative water treatment technologies and strategies, research on transit technologies, help Durango

Transit understand how students are using the T

Goal 2: Participate in local, regional and state partnerships that further sustainability

Objective 2.1: Assist youth from the region in crafting a sustainable future for their communities

Potential Indicators	Chosen Indicators
# of FLC-assisted sustainability projects or programs that connect with local youth Youth participation in sustainability projects supported by Fort Lewis College	# of FLC-assisted sustainability projects or programs that connect with local youth
Rationale We recommend counting site-based programs as their own project. For example, if the EC's Local Food Team helps to start three school gardens, this would count as three projects.	

Current Situation at FLC	Targets at Other Schools
The Environmental Center is in the second year of piloting an environmental youth leadership program with middle and high schools. We believe there is a potential to build off of this program to create a broader campaign supporting youth engagement and "green jobs" for youth. We are currently working with the Durango Youth Coalition and the lead organizers for Children, Youth, and Family Master Plan about how to coordinate our efforts. We feel there is potential to partner with Adventure Education, Teacher Education, and the Environmental Studies program. Students from the Environmental Center are also regular participants in monthly Farm-to-School meetings. We are also partnering the Garden	Colorado College - Art in the Afternoon provides art education to students at Taylor Elementary School. Volunteers teach a variety of art mediums to encourage creativity and high self-esteem. CU-Boulder – Earth Education program takes CU-students into local elementary schools to teach environmental education lessons. Michigan State – Received a $45,000 grant for their engineering students to work with 5th and 6th graders on a solar-heated worm composting system.

Project to assist with school gardens in the region.	

Five-Year Target	Actions to Achieve Target	Responsible Parties	Cost/Resources Needed
FLC will assist with the establishment of at least three sustainability-related youth projects or programs in the region	Support civic engagement around sustainability issues in local school districts	**Environmental Center**, Center for Civic Engagement	All of the actions listed can occur without additional capital funding, except for the regional youth conference. All would benefit from additional grant funding.
	Assist local students in creating "greener" schools	**Environmental Center**	
	Host a regional youth conference on sustainability	**Environmental Center**, Center for Civic Engagement, TRIO-Upward Bound, Adventure Ed	We estimate a regional youth conference would cost $4,000 to $6,000. Costs are higher than an adult conference because we would have to keep registration costs low. If FLC could provide housing to youth and chaperones, we could charge more and the capital outlay would be less.
	Work with Region 9 and other groups to conduct research on the potential to expand the green economy	**Environmental Center**, SOBA, Small Business Development Center	
	Develop sustainability and place-based curriculum and training for area educators	**Environmental Center**, ENVS program, Adventure Education, Teacher Education	**Benefit/Payback Period**
	Work with the City and County to establish a youth-run sustainability grant program	**Environmental Center**	FLC is well-positioned to engage the area's youth and this could benefit with increased recruitment from within the region. These programs also provide great public relations for the College.
Rationale There is strong interest among students at the Environmental Center in working with youth. With Adventure and Teacher Education and the Environmental Studies internship program, we feel Fort Lewis is well-positioned to have a positive impact on youth in the			

area. The City of Durango, Towns of Ignacio and Bayfield, La Plata County, and the Southern Ute Indian Tribe have all adopted the Children, Youth, and Family Master Plan. It outlines several specific goals and objectives that the College can assist with and provides a framework for this objective.

The Environmental Center and the Center for Civic Engagement can take the lead on connecting with area schools and youth programs. The CCE already has a working sub-committee on connecting with 9-R, and the EC's experience can be especially helpful in greening local schools. The Southwest Conservation Corps has youth crews in almost every town in the region and the TRIO-Upward Bound program also works with youth throughout the region. Finally, the Discovery Museum will be presenting education about energy and new technologies.

This can form the basis for an effective youth conference. Creating effective networks for young people with an interest in sustainability supports involvement. Economic opportunity is perhaps the most important determinant of whether local youth remain or return to this area. Development of a "green economy" can be a catalyst to youth involvement in sustainability issues. The EC's initial youth leadership pilot program was with Miller Enterprises and touched upon aspects of sustainable business and the green economy. Finally, while we want to support young people in creating a sustainable future, one of the ways to do this is to provide resources and training for their adult allies. Teacher trainings in partnership with groups such as Durango Nature Studies can help infuse sustainability into local curriculum.

Objective 2.2: Leverage the purchasing power of the College and its community members to further sustainable economic development within the Four Corners region

Potential Indicators	Chosen Indicators
Dollars spent that supports sustainable regional economic development	Dollars spent that supports sustainable regional economic development

Rationale

In the consumption portion of the sustainability action plan we discussed tracking various "green" attributes of goods and services purchased by the college. Impact on regional sustainable economic development would be another attribute to measure using the same system we hope to set up for other purchases.

Current Situation at FLC	Targets at Other Schools

We currently have no criteria for evaluating College purchases relative to regional sustainable economic development and no system in place for tracking these purchases. The Environmental Center is helping to launch Local First, an alliance of locally-owned, independent businesses, the group that created the *Be Local* Coupon Book. This group is affiliated with the national group BALLE (Business Alliance for Local Living Economies), a national leader on green economic development strategies. At the same time, the Small Business Development Center has worked for a number of years to provide support to local businesses and is very involved with the Chamber of Commerce and La Plata Economic Development Leadership Action. They provide training to entrepreneurs and small business start-ups and are important regional resource. These connections provide an avenue for Fort Lewis to enter the dialogue about regional economic development.	Colorado College - The Business and Community Alliance of Colorado Springs is a group of local citizens who are working with the College to demonstrate the mutual reliance of College and community. Oberlin - When Oberlin College agreed to purchase an estimated 50% of its electricity from green sources, the College established a Sustainable Reserve Fund of $2 per MWhr that Oberlin pays as a premium for green power. This money is overseen by the City Council and is available for local energy conservation and greenhouse gas reducing projects. CSU – CSU has organized a consortium of Colorado colleges to invest in a large wind farm in eastern Colorado to help CSU and other schools meet their obligations under the President's Climate Commitment. Columbia University – Committed to create a $20 million affordable housing fund for West Harlem as part of its expansion plans

Five-Year Target	Actions to Achieve Target	Responsible Parties	Cost/Resources Needed
Increase from baseline in the percent of campus purchasing that supports sustainable regional economic development	Establish criteria for purchasing that supports sustainable regional economic development and track using the Banner 8 system	**Environmental Center**, SOBA	There is little to no cost for these action items. Students could take the lead in gathering most of this information.
			Benefit/Payback Period
	Identify areas where FLC's purchasing and green entrepreneurship would have	**Environmental Center**, SOBA	Focusing on sustainable regional economic development will have a string

	the greatest impact on regional sustainability Inform the campus community about how their purchasing decisions can support sustainable region economic development Do outreach to the Region 9 general quarterly meeting *Other ideas that support this objective are located in the Consumption section of the plan.*	 **Environmental Center** **Environmental Center**	of public relations benefits for the College.

Rationale

This objective works in concert with the purchasing objective in the Consumption section of the plan. It also connects with the action items listed above having to do with the "green economy." Tracking purchases that support sustainable local economic development is contingent on having the software system in place that allows for recordkeeping based on custom criteria. The new Banner 8 system has this capability. We can work closely with Region 9, the Small Business Development Center, Local First and other groups to identify criteria and then have students or a class work on classifying products in the Stores catalog. It's likely that only a handful of products come from local, green, suppliers and so this task shouldn't be too onerous to complete. The second action item would be a great project for SOBA students to undertake.

This objective is closely connected to the current strategic plan, which measures jobs and capital formation catalyzed by the Small Business Development Center as a measure of service to the region. This objective simply adds another layer of monitoring to this current task.

Other ideas discussed: purchasing from local suppliers whenever possible, working with Sodexho to purchase food from local farms, set up a local, green purchasing discount program with local stores and shops,

Objective 2.3 Contribute to the public policy decisions that support sustainability

Potential Indicators	Chosen Indicators
# of public policy decisions that FLC are a part of	# of public policy decisions that FLC are a part of
Rationale Given the wording of the objective, this seems to be the only discrete indicator to use.	

Current Situation at FLC	Targets at Other Schools
The College currently participates in public policy surrounding sustainability informally. Organizations and agencies approach individual faculty and staff members about particular initiatives. For example, there are FLC community members working with the Discovery Museum on energy education, and several individuals recently participated in focus groups about county transit and land use plan. The Office of Community Services works closely with various land management agencies. The EC coordinator participates in local and regional discussions that can result in student projects, but the demand far outstrips his available time. We do not have a mechanism to identify liaisons that can speak for the College on various sustainability issues. For the past several years the Environmental Center has played an important role in the dialogue on community food security. In 2007, the Center hosted the Homegrown Conference, a two-day event that brought over 175 people to campus to discuss these issues. The Center is currently participating in a USDA Community Food Projects grant with numerous other community partners.	University of Victoria - The Environmental Law Centre Society is a registered non-profit that runs the Environmental Law Club and the Environmental Law Clinic. It provides research and advocacy on public interest environmental issues and draws on the expertise and involvement of students, professors, legal practitioners and environmental activists. University of Victoria – Pacific Climate Impacts Consortium "seeks to bridge the gap between climate research and climate applications and will make practical information available to government, industry, and the public". UC-Santa Cruz – The university signed a compact with the city and county officials pledging to work together to reduce their impact on the climate.

Five-year Target	Actions to Achieve Target	Responsible Parties	Cost/Resources Needed
FLC will make a noteworthy contribution to at least three public policy decisions that further regional sustainability	Create a mechanism for assigning representatives to regional policy and planning initiatives and tracking participation	**Administration**, PACEA	These are all organizational actions. They will cost staff time, especially for the representatives on various committees and task forces. But there will be no capital costs.
	Create a mechanism for a sustainability review of regional policy initiatives that come to the College	**PACEA**	**Benefit/Payback Period**
	Integrate a means for communicating opportunities to participate in policy discussions and important news into the proposed sustainability web portal	IT, **Campus Sustainability Officer**, Environmental Center	Participation by faculty and staff will ensure there is an information flow back to the College on important issues, provided that we can set up an easy system for reporting. This will also get the College out into the community more and develop working relationships with various stakeholders.
	Create a means for raising awareness of students about sustainability policy decisions that affect them	**Environmental Center**	
	Working with LPEA to increase the % of LPEA's portfolio that comes from renewable sources	PPS, **Environmental Center**	
	Work with the City and County on joint recommendations for the resource management in	**Administration**	

	Horse Gulch natural area Work at the state-level to influence policies impacting our ability to be a sustainable campus Create an advisory council on public land management issues in the region that makes recommendations to the President and Board of Trustee Explore the feasibility of having the College participate as a cooperating agency for public lands issues through an MOU with the Forest Service and BLM – possibly have a student on work-study to represent the College Examine the long-term feasibility of facilitating a collaborative or policy council on local food issues	 **Administration**, ASFLC Administration, **OP**, Environmental Center, Office of Community Services Administration, **OP**, Environmental Center, Office of Community Services **Environmental Center**, Office of Community Services, Agriculture Program	
Rationale Specific planning and policy initiatives that FLC could participate in: Four Corners Air Quality Monitoring Task Force, Durango Transportation Advisory Board, the SW Regional Transportation Planning Commission, Smart Energy Committee for Sustainability, Sustainability Alliance Smart Energy Committee, County Climate Action Planning Process, Farm-to-School committee, San Juan Basin Recycling Association. It would be helpful to outline different levels of participation by the College and find ways to register			

participation by FLC community members. Requests for official representation should go to the President, who can designate someone or delegate the responsibility for appointing someone who can then speak for the College. Students, staff, and faculty that are not specifically representing the College would participate as individuals. There should be an easy and convenient way for people participating in these planning initiatives to post what they find in order to let others know what's going on. Similarly, when the College is asked to take a policy position, we need a mechanism for review to see if it supports regional sustainability. PACEA could be this review panel that provides a recommendation to the President.

Working with LPEA and on the Horse Gulch issue are already projects that are underway, but do not have a specific organization or committee attached to them as yet. This is the main reason they are broken out as separate actions. The web portal discussed in the Education and Engagement section of the plan could provide a means for communicating opportunities for community involvement.

Working at the state level could mean working with the Alliance for a Sustainable Colorado and connecting with other student governments around the state. If campuses worked together, they would have a much greater impact on state policy than if we were to lobby separately. Getting student governments from different campuses together to discuss sustainability goals and desires is another important strategy. Making students aware of policies that directly affect their education would be very productive.

Policy decisions related to the management of public lands are especially important for the College to pay attention to. The College is a major user of public lands through Outdoor Pursuits, Adventure Education, and academic departments that conduct research in natural settings. Becoming a cooperating agency means that the College will receive notice of policy decisions and has a formal seat at the table when policy changes are under consideration. This would come with the expectation that the College would have a regular presence. We need to know more about the time required before making this commitment.

Finally, as a group relatively free from political pressure, there is potential for the College to play a long-term role facilitating communication, networking, and partnerships that further community food security. The key ingredient to make this happen is staff time. Outside funding would be needed to support a staff position, but this could be supplemented with work study students. Local food is consistently the most popular student team at the Environmental Center and there is a demand for student opportunities to work on these projects. This could be of great benefit in marketing the College to prospective students.

Other ideas discussed: Facilitation of regular meetings of Environmental Health and Safety officials in the region.

Goal 3: Use the theme of sustainability to further community-based learning and research on campus

Objective 3.1 Provide a more comprehensive and efficient system to match campus resources with community needs and interests around the topic of sustainability

Potential Indicators	Chosen Indicators
Number of project-related referrals Number of faculty and staff who list their interests with the Environmental Center Number of successful projects resulting from the initial contact Overall increase in student participation in sustainability projects Senior seminar projects related to sustainability Courses engaged in CBLR projects related to sustainability Traffic on the sustainability web portal listing CBLR resources	Number of project-related referrals Number of faculty and staff who list their interests with the Environmental Center Senior seminar projects related to sustainability Courses engaged in CBLR projects related to sustainability
Rationale These indicators were also chosen within the Education and Engagement of the Sustainability Action Plan.	

Current Situation at FLC	Targets at Other Schools
The Environmental Center and Center for Civic Engagement currently manage referrals for students, faculty, and community partners seeking to make a connection. The hope with this objective is to provide stronger direction so the EC and CCE can better coordinate their efforts. The EC has a database that can serve as an effective tool for cataloguing and mapping interests of faculty, staff, and community partners. The Environmental Studies program has completed a CBLR plan for its degree program. With all these pieces in place, there is great potential to develop an effective matching system around the theme of sustainability.	We have not as yet been able to find programs that focus specifically on sustainability partnerships.

Five-year Target	Actions to Achieve Target	Responsible Parties	Cost/Resources Needed
20% in the faculty and staff participating in a campus-wide referral system related to sustainability	Map interests of faculty and staff and current CBLR activities related to sustainability	**Environmental Center,** Center for Civic Engagement	There are no capital costs for the actions listed, but significant staff time will be necessary. Relieving the Environmental Center from filling the role of campus sustainability office. There are grants that the EC and CCE can pursue to support this work. Once the system is established and streamlined it should operate with minimal labor.
An increase in the number of project-related referrals, senior seminar projects, web traffic, and courses with CBLR resources related to sustainability .	Use the EC database or other networking software (e.g. Facebook) to catalogue and match people with similar interests. Integrate this information into the proposed Sustainability Web Portal	**Environmental Center,** IT, Center for Civic Engagement	
			Benefit/Payback Period
	Work with the alumni office to identify alumni connected to sustainability issues and who can serve as mentors	**Environmental Center**, Alumni Office	These actions and targets can help achieve the goals and targets set out in the current strategic plan.
	Recruit a community advisory committee for sustainability-related CBLR projects	**EC**, ENVS program, Center for Civic Engagement	

Rationale

The focus of this objective is on matching resources. Objective 3.2 focuses on creating an effective experience once the match is made. Because the Environmental Center already has many relationships within the community around the topic of sustainability, there is great potential for CBLR to thrive around this topic. Other programs that can contribute to CBLR work along these lines include:

- the Environmental Studies department, which has a strong CBLR component
- the Leadership Center, which is charged with developing the co-curricular transcript
- the Office of Community Services, which has relationships with public land management agencies and local governments

By working with the Center for Civic Engagement, the Environmental Center can help elaborate the CBLR vision and help it achieve significant portions of CCE's strategic plan. For example, mapping current CBLR projects and faculty interests is already a part of the CBLR strategic plan, as is creating an online system for accessing this information. The actions listed under this objective will simply enhance implementation by providing a pilot for the development of CBLR strategies around other topics and themes. For example, the Environmental Studies program has discussed setting up a community advisory committee. This could serve as a pilot for the advisory committee function listed in the CBLR strategic plan. The biggest challenge under these actions will come in recordkeeping of people's interests. Only the most important aspects of CBLR work and interest should be attempted until the system becomes streamlined enough to allow for more depth of analysis.

Objective 3.2 Help students, staff, and faculty make substantive, hands-on contributions to sustainability projects across the region

Potential Indicators	Chosen Indicators
Senior seminar projects related to sustainability Courses engaged in CBLR projects related to sustainability Courses whose content deal with questions of sustainability Use of materials from the EC library for classes Partnerships between the EC and specific courses Invitations for the Environmental Center to present to classes Successful student initiated projects (from beginning to completion) Overall increase in student participation in sustainability projects	Senior seminar projects related to sustainability Courses engaged in CBLR projects related to sustainability Successful student initiated projects (from beginning to completion) Overall increase in student participation in sustainability projects
Rationale The College is moving forward with its co-curricular transcript program and the Environmental Center is one of the test cases for tracking these variables.	

Current Situation at FLC	Targets at Other Schools
The Environmental Center and the Center for Civic Engagement help facilitate partnerships and student experiences. This past semester, students in the Environmental Studies capstone course	Colorado College – Offers a student orientation experience for 390 students who engage in urban and front county service-based trips in Colorado and in the Southwest while approximately 160

completed a substantive study of the future of Horse Gulch. The Environmental Center presented this as a potential project to Dr. Brad Clark and then was able to supplement the project with outside research and outreach activities funded by an outside grant. After their final presentation, the students were invited to present their conclusions to the county commissioners and an article appeared in the *Durango Telegraph* outlining their study. This is an example of the outcome that effective collaboration can produce.	participate in back country service trips in the Colorado Mountains for four days. Colorado College - Students staff the college's soup kitchen, the only one in the United States operated by a college. Oberlin College - Student groups worked with local schools, churches, business associations and community groups to exchange inefficient incandescent bulbs for energy efficient compact fluorescent bulbs at no cost. Portland State University - Community Watershed Stewardship Program is a partnership between Portland State University (PSU) and Portland Bureau of Environmental Services (BES). The CWSP engages and supports the community and neighborhood residents in watershed improvement projects through campus-community partnerships. Evergreeen College - The Community Garden has over fifty 12'x12' plots available to anyone in the area. Community members are asked to pay $20. CU-Boulder - Students do T1 energy audits in low-income homes and perform free weatherization and energy audits. This program partners with the local government.

Five-Year Target	Actions to Achieve Target	Responsible Parties	Cost/Resources Needed
An increase in the chosen indicators	Develop a sustainability award for CBLR work for students and faculty Provide in-service workshops	Environmental Center, **Center for Civic Engagement**, The Leadership Center Environmental Center, ENVS	The three items in this list that would require capital outlay are: • The award program • The faculty grants

	for community partners hosting CBLR projects related to sustainability Provide Engaged Department workshops for interested departments and faculty about sustainability Provide faculty grants for project developments related to sustainability Develop a voluntary assessment tool for CBLR activities related to sustainability Facilitate inclusion of sustainability-related CBLR activities in the co-curricular transcript program Host a state conference on sustainability-related community partnerships Facilitate student-directed projects that meet campus and community needs Work with the State Land Board and other partners to	program, **Center for Civic Engagement** Environmental Center, **Center for Civic Engagement** Environmental Center, Center for Civic Engagement, **FLC Administration** **Environmental Center**, Center for Civic Engagement **Environmental Center**, Center for Civic Engagement, The Leadership Center Environmental Center, **Center for Civic Engagement** **Environmental Center** Environmental Center, CCE, **Old Fort Task Force**	• The state conference We estimate together these programs would cost roughly $10,000 with a one-time cost of $3000 for the conference, which might be funded by the Colorado Campus Compact. The rest of the activities will require some significant staff time. Grant funding to pay for staff support that could take the form of student workers or part-time staff might be available. **Benefit/Payback Period** The benefit is again the fulfillment of the current strategic plan and creating an effective model for CBLR that can help with implementation around other important themes. In the meantime, success on this objective will give the college several projects to highlight and use for recruiting.

	create a management plan for the Old Fort that showcases sustainability and serves the region		

Rationale

Once there is a match between campus resources and community needs, the CBLR Strategic Plan outlines several elements that will lead to effective community partnerships. The activities listed above can pilot implementation of these elements around the theme of sustainability and support the CBLR strategic plan. To do this, the EC can work closely with the Center for Civic Engagement and the sub-committees that it has established.

At the same time, the Environmental Center can continue to facilitate student-initiated and student-directed projects, and the current Old Fort Task Force can continue to develop the potential for sustainability demonstration projects on the Old Fort campus. Students especially wanted opportunities for hands-on experience that will connect abstract ideas and theories to concrete community experiences. Because we currently have no baseline on the chosen indicators, we simply list an upward trend as the target.

Other ideas discussed: During the study circle process several specific ideas and projects were suggested. These include:

- Providing storage for agricultural supplies/materials
- Providing volunteer labor (internships) to local farms, ranches, and gardens
- Collaborating with the creation of a community kitchen and the production of value-added products
- Assisting in creation and maintenance a food distribution center(s)
- Providing seed sources and starts for local producers
- Increasing the ease of re-use of material at FLC and in community
- Assisting with drop-off areas for items (batteries)
- Assisting with coordination and communication of EHS agencies
- Collaborating with city about electronic recycling and helping with outreach

Section Title – Coordination and Support

Context & Current Situation

Fort Lewis College has done a very good job creating a sustainable campus. Woodard and Curran, the consulting firm that completed a Sustainability Assessment of the College, gave Fort Lewis an overall grade of "B-" for our sustainability performance in comparison to other institutions, but said that if you take into account the resources the College has to devote to sustainability (which are considerably less than other institutions), we would receive a grade of A-. One of the consequences of the lack of resources has been the College's inability to adequately market its sustainability successes.

Over the years, the Environmental Center has provided leadership around sustainability issues. The Center's role as a student organization, its limited staffing, and increasing demands by the campus and community hinder its ability to manage sustainability issues for campus. This year, the Center's board approved a new mission that focuses the Center's efforts on strengthening students' commitment. This change signals an intention to assist with campus sustainability through student and class projects, but to move away from its role as a resource center and de facto sustainability office for the College.

Physical Plant Services, and more recently Student Housing and Conference Services, have also provided leadership on sustainability issues at an operational level, and individual faculty have played an important role. Coordination of these efforts, however, has occurred on a project-by-project basis. Since its inception in 2000, The President's Advisory Council on Environmental Affairs (PACEA) has played a useful role in facilitating communication between various entities on campus and in the community and has provided the President with the collective thinking of concerned individuals on a number of issues. PACEA succeeded in crafting the school's first environmental policy statement and added "green" elements to the Campus Master Plan. PACEA has not, however, performed an ongoing coordinating function for campus activities.

With the signing of the President's Climate Commitment, the need for increased coordination has increased, as the commitment requires ongoing collection and processing of data for a bi-annual greenhouse gas inventory and regular progress reports on sustainability. Meeting the Governor's Office executive orders related to energy use, purchasing, and waste will also likely require additional coordination.

Given this history, the coordinating committee for this planning process has taken on the task of recommending organizational strategies and structures that will allow the College to achieve the targets specified in the other sections of the plan. This is not exactly the same as recommendations for implementing the action plan, which deals more with the immediate steps following the plan's

approval. This section of the plan concerns itself with the organizational pieces that need to be in place for the next twenty years as opposed to simply the next five.

The committee has had three substantive discussions on this question, focused on decision-making structures and community norms, recordkeeping and evaluation, and staffing and financing. As a result of these discussions, we identified four important guidelines for coordination and support. The goals and objectives outlined below flow from these guidelines.

- Infusion – Decisions should work to integrate dialogue and student learning about sustainability across campus
- Adaptation – It is important to monitor progress, reflect on strategies, and adapt our approach to achieve continual improvement
- Communication – Clear communication pathways are essential encourage transparency, participation, and mutual understanding between students, staff, faculty, and administration
- Strategic Action – Ensure that the College's investment in sustainability provides the greatest possible return

In comparison to other schools, the College is well-positioned to succeed. Most other campuses are just launching their Sustainability Offices, almost all of which have a sprawling mission and goals that encompass much of what the Environmental Center attempts to do. The Environmental Center is well-positioned to support the community-based learning and research opportunities related to sustainability and to engage the campus community on sustainability issues. This means a Sustainability Office at FLC will be able to be more focused on performance issues and overall coordination, which will likely make the entire effort more successful more quickly than at other institutions. Despite our limited means, FLC can move more quickly than other colleges if it gets started in the very near future.

Strategic Direction:

Fort Lewis College has a coherent and coordinated approach to campus sustainability.

Goals & Objectives

Goal 1: Make sustainability an integral part of Fort Lewis College's long-term future

- Objective 1.1 - Incorporate sustainability into all aspects of campus planning
- Objective 1.2 - Monitor progress on campus sustainability
- Objective 1.3 - Where necessary, revise existing policies to align with sustainability action plan

Goal 2: Make the most of the capacity, knowledge, and skills within the Fort Lewis College community to advance the goals of the Sustainability Action Plan

- Objective 2.1 - Coordinate the efforts of students, staff, faculty, and the administration on campus sustainability
- Objective 2.2 – Support faculty and staff who wish to integrate sustainability into their work and the work of their department

Goal 3: Increase understanding of sustainability-related decisions and their connection to the overall well-being of the institution

- Objective 3.1- Maintain a clear understanding of the financial costs, benefits, and risks to the institution of all decisions
- Objective 3.2 – Incorporates ongoing assessment, reflection and adaptation to current conditions into the decision-making process around sustainability
- Objective 3.3 – Engage the campus community in discussion about the College's designated priorities with regard to campus sustainability

Goal 4: Provide the resources necessary for the campus to achieve the targets outlined in the Sustainability Action Plan

- Objective 4.1 – Secure funding to achieve the targets in the Sustainability Action Plan
- Objective 4.2 – All campus employees possess the knowledge, tools, and training they need to implement the Sustainability Action Plan

Rationale:

Achieving sustainability is more of a process than end state, as the environmental, social, and economic conditions affecting the College are in a state of constant flux. For Fort Lewis to make progress in this area, the campus must put processes in place that allow the College to learn and adapt. The objectives under the first goal seek to accomplish this by incorporating sustainability into campus policies, planning, and data collection. These functions articulate institutional priorities and outlive the tenure of specific individuals. They also provide both accountability and a mandate for staff working at the departmental level.

For successful implementation, the committee believes there should be a combination of centralized planning and decentralized execution at the departmental level. This presents challenges in terms of coordination and communication around various efforts. The second goal is an attempt to address this challenge. Success also depends on broad participation across campus. While the education

and engagement section speaks to engaging specific individuals, objective 2.2 aims to provide the support to faculty and staff who wish to integrate sustainability into their job description.

Goal three in this section of the plan focuses on making decisions broadly understood among the community as this is essential to create a shared sense of personal responsibility with regard to sustainability. For example, the hope is that as community members, there is self-satisfaction in picking up trash because it's the right thing to do and people understand it as an expectation of being a part of Fort Lewis College. Making sure that everyone in the FLC community understands the decisions and priorities of the institution and how to provide input is essential to create this sense of community responsibility.

The final goal addresses the need to focus specifically on finding resources to support the action plan as it moves forward. A primary criteria for inclusion in this initial action plan, is that initiatives will have minimal cost to the institution over the long-term or they have the potential for funding through grants or other outside sources. Nevertheless, financial resources will be necessary, even for projects that will eventually payback to the College. Training and technology needs fall under the second objective.

Next Steps

A final item for discussion is how to proceed prior to the hiring of a Campus Sustainability Officer. Prioritizing work until this plan can gain the necessary staff support will help keep momentum going forward. The committee anticipates that the Environmental Center and/or the chair of PACEA will take a leading role during this transition period. With this in mind, there are several appendices attached to this document. These include

- Implementation Plan created during May of 2009 – Appendix 1
- List of priority action items – Appendix 2
- List of responsibilities for the Environmental Center during the period of transitional staffing – Appendix 3
- Draft of the Campus Sustainability job announcement – Appendix 4
- Diagram of the proposed organizational structure for management of the action plan – Appendix 5

Note that the names that appear in **bold** are the parties that would have primary responsibility for the listed action item. Other names listed would be involved in the planning or implementation.

Goal 1: Make sustainability an integral part of Fort Lewis College's long-term future

Objective 1.1 - Incorporate sustainability into all aspects of campus

Potential Indicators	Chosen Indicators
Sustainability incorporated into strategic plan Sustainability incorporated into campus master plan Sustainability incorporated into planning at the departmental level	Sustainability incorporated into strategic plan
Rationale In our earliest discussions, the committee appreciated the need to link sustainability, both philosophically and practically, with existing structures and priorities of the institution. We understand the current priorities of the trustees to be enrollment, faculty retention, and fundraising. For this reason, the committee feels that incorporating sustainability into the next strategic plan is imperative for success. We discussed the importance of establishing clear priorities with regard to sustainability and choosing three to five primary areas of focus. These priorities would then be candidates for inclusion in the next strategic plan and could serve as proxy measurements for overall sustainability. We did not choose the other two indicators because sustainability is already integrated into the campus master plan and planning at the departmental level will occur to some degree if sustainability is in the strategic plan.	

Current Situation at FLC	Targets at Other Schools
Sustainability issues and concerns are not explicitly stated as values or goals in the current strategic plan. Though the College as an institution and numerous individuals within the FLC community support the idea of sustainability. The planning process for the next strategic plan will begin in 2010. Outreach associated with the Sustainability Action Plan can help build a constituency for sustainability to become a strategic direction for the College.	Oberlin – Moving toward environmental sustainability identified as a core value for the strategic plan. UCCS – Has identified sustainability as one of the main goals in the strategic plan and is working to make sustainability a core value of the institution

Five-year Target	Actions to Achieve Target	Responsible Parties	Cost/Resources Needed
Sustainability identified as a strategic direction in the 2012-2017 strategic plan	Research connections between campus sustainability and enrollment	**Enrollment Services**, EC	No specific resources are needed to achieve this target.
	Discuss campus sustainability with the deans, faculty senate, and department chairs	**Environmental Center**	**Benefit/Payback Period** Achieving this target will make all the other targets in the action plan significantly easier to achieve.
	Outreach to campus departments and student groups about the action plan	**Environmental Center**	
	Identify ways to integrate sustainability into existing and developing planning efforts across campus	**Environmental Center**	
	Explore means to directly engage the Board of Trustees in sustainability issues	Environmental Center**, PACEA**	

Rationale

As an institution with limited resources, Fort Lewis has to focus on a limited set of priorities. The surest way for the action plan to succeed is to make sustainability one of these institutional priorities. Making the rest of campus aware of the extensive planning that has occurred this year and soliciting feedback will generate advocates for this position once the process of creating the next strategic plan begins in 2010. Incorporation into the strategic plan is also one of the primary credits given as part of the AASHE campus rating system.

Objective 1.2: Monitor progress on campus sustainability

Potential Indicators	Chosen Indicators
Systems in place to capture and analyze sustainability data Regular campus reports on sustainability progress	Systems in place to capture and analyze sustainability data
Rationale During our discussion of recordkeeping and evaluation, we agreed to the mantra that "if we don't measure it, it doesn't exist" and that we need to pursue initiatives that we can measure. At the same time, we need to find efficient ways of capturing information that won't require a great deal of staff time and money. This pointed us again toward the strategic plan that already has data collecting mechanisms in place. In this scenario, the College would choose a few key priorities to measure within the strategic plan. The remaining targets in the Sustainability Action Plan would still receive attention but just not as part of the strategic plan. We discussed trying to align the priorities with the national rating systems and "green" college surveys that are currently emerging. Some of the information we need to collect will be technical, but some will be about attitudes and knowledge of people on campus.	

Current Situation at FLC	Targets at Other Schools
The action plan is generating a large number of new responsibilities for measurement and evaluation. While much of the data exists with regard to operations, it is not centralized in one location or office. The Sustainability Assessment Report by Woodard and Curran was the first attempt to bring all this information together in one place. This set the stage for the current planning effort. The Environmental Center played a lead role in assembling this information. Long-term, however, the Center is moving away from its role as a de-facto sustainability office necessitating a new solution. If sustainability becomes part of the next strategic plan, the Office of Institutional Research and Strategic Planning could become the central office for this information. The Environmental Center has performed an audit of the	Most other schools are putting in place systems to support the monitoring of their sustainability plans and at the very least to complete their greenhouse gas inventories.

monitoring tasks required by the Sustainability Action Plan. This audit can help identify the most efficient and least onerous ways to collect and store the information. Some of the most important data to collect is building-by-building usage of electricity, natural gas, and water. The College is in the process of installing electricity meters on transformers across campus that will allow us to get real-time information on building performance. FLC has recently joined AASHE, the national coordinating group for campus sustainability, but has not joined the National Wildlife Federation's Campus Ecology program. The last two years we have received campus sustainability surveys from the Peterson's and the Princeton Guides.	

Five-year Target	Actions to Achieve Target	Responsible Parties	Cost/Resources Needed
Collect data on the most important metrics to measure sustainability at Fort Lewis College.	Identify priorities for monitoring and data capture related to the action plan	**Environmental Center**	The upfront costs for metering buildings and purchasing a truck scale are high. A water meter costs on average $5,000 per building. A truck scale would cost $40-$60,000 to install. These investments, however, should result in savings over time. Ongoing membership in AASHE for FLC will cost $1000/year.
	Work with IT to streamline data collection and reporting	**Environmental Center**, IT	
	Put in place mechanisms to efficiently capture data for the bi-annual greenhouse gas inventory (e.g. official travel, commuter survey)	**Environmental Center**, IT	
			Benefit/Payback Period
	Install meters for electricity, natural gas, and water on as many buildings as possible	**PPS**	Having these measurements in place will allow for a much more effective education

	Purchase a truck scale to measure solid waste and renegotiate contract to pay for disposal by the pound. Consider participating in the STARS campus sustainability rating system and maintain membership in AASHE	**PPS** **Administration**	program about impacts at Fort Lewis. PPS has suggested pursuing additional metering as part of the state performance contract, and it is possible to get a grant for the cost of the truck scale. An AASHE membership will allow FLC to participate in the STARS campus rating system. I believe FLC would receive a high score and this would identify FLC as a leader on these issues. The membership also comes with discounts to conferences access to resources from other member institutions.
Rationale Preliminary discussion suggests that the College should give priority in monitoring energy conservation and efficiency and waste sent to the landfill as these have the potential to save the College money. The savings would be much greater for waste if we had a truck scale and renegotiated the contract on per pound basis. Two other suggested priorities are education and engagement on campus and service to the region. The College already has structures in place with the Center for Civic Engagement and the Environmental Center to make substantial progress in these areas.			

Objective 1.3: Where necessary, revise existing policies to align with sustainability action plan

Potential Indicators	Chosen Indicators
# of policies that support sustainability goals # of policies that work against sustainability goals % of policy areas that have undergone a sustainability review	% of policy areas that have undergone a sustainability review

Rationale It makes more sense to assess broad areas of policy at the College rather than enumerating specific policies points and subsections.

Current Situation at FLC	Targets at Other Schools
In terms of policy review, this is a function that PACEA has played in the past and could again. For example, PACEA drafted and recommended FLC's current environmental policy to the President. They also revised the Campus Master Plan to incorporate sustainability.	Colorado College – Giving priority to developing policies for Building Construction, Building Use, Purchasing and Socially Responsible Investment.

Five-year Target	Actions to Achieve Target	Responsible Parties	Cost/Resources Needed
Review College policies relative to the Sustainability Action Plan	Creation of a prioritized list of recommended policy changes Recommended policy changes reviewed by PACEA and forwarded to the President or appropriate Vice-President for consideration	Environmental Center, **Campus Sustainability Officer** **PACEA**	No resources beyond staff time are required **Benefit/Payback Period** There is no direct payback but this will make the rest of the plan function better.
Rationale Rather than generating entirely new policies, a first step would be to assess the different policies governing the College in light of the Sustainability Action Plan. From this, could emerge a prioritized list of recommended policy changes for consideration by PACEA and the President.			

Goal 2: Make the most of the capacity, knowledge, and skills within the Fort Lewis College community to advance the goals of the Sustainability Action Plan

Objective 2.1: Coordinate the efforts of students, staff, faculty, and the administration on campus sustainability

Potential Indicators	Chosen Indicators
# of departments with a designated contact for sustainability % of sustainability efforts and initiatives linked to action plan % of efforts and initiatives listed on sustainability web portal	% of sustainability efforts and initiatives linked to action plan % of efforts and initiatives listed on sustainability web portal
Rationale The action plan is the vehicle for coordination. The education and engagement and service portions of the plan require an inventory of projects and initiatives related to sustainability. By measuring the specific connections to sustainability, we can gauge the level of coordination. The website is a very visible way to allow people to see how their project or initiative relates to the larger picture.	

Current Situation at FLC	Targets at Other Schools
The EC is attempting to strengthen coordination by taking the lead role in drafting this plan. The Center, however, does not wish to serve this function over the long-term and wants to focus instead on involving students in projects related to the action plan. In the past PACEA has allowed different parts of campus to talk with one another about these issues. While valuable, this communication function has meant that PACEA has often served as a means for information exchange rather than as an advisory body providing perspective and advice on issues identified by the President. Neither the EC nor PACEA seems to be an effective solution to coordinating efforts around campus. An additional position seems to be in order, but the campus is currently under a hiring	University of Victoria – UVic created the Office of Campus Planning and Sustainability reporting to the VP of Finance and Operations. Major goal of office is to create a cross-campus communications strategy Evergreen – Director of Sustainability sits in on the following committees: Sustainability Council (co-chair), Campus Land Use Committee, Space Management Committee, Faculty Planning Institutes, Presidential Staff Meetings, Summer Institutes, Clean Energy Committee, Freshman Orientation, Print Management Group (coordinator) Stanford - Department of Sustainability and Energy Management is in Physical Plant. They have three staff.

freeze because of the economic crisis. This past year, the College did contract with the consulting firm Earthly Ideas to help coordinate sustainability efforts on the three new green buildings moving forward on campus. This has helped to ensure that sustainability issues do not fall through the cracks during construction. The Environmental Center also worked with the marketing staff at the College to create the new Pathways to Sustainability program, with its own website and logo. Further development of this initiative and the website can improve coordination across campus.	Yale – Office of Sustainability has an outreach coordinator that works with a team of 24 students. UC-Santa Cruz – coordinates 10 student groups working on sustainability issues. UC-Berkeley – Has monthly meetings of the Chancellor's Advisory Council UCCS – Has a Sustainability Advisory Committee that meets quarterly

Five-year Target	Actions to Achieve Target	Responsible Parties	Cost/Resources Needed
80% of efforts and initiatives catalogued on campus relate to objectives listed in the Sustainability Action Plan	Create an appropriate plan for coordination until we are able to hire a Campus Sustainability Officer (CSO) Create a job description and announcement for the position Identify the best home within the institution for the office Hire a Campus Sustainability Officer (CSO) to coordinate efforts on the action plan Prepare the necessary materials for the CSO to succeed	**Environmental Center** **Environmental Center** **PACEA** **Administration** **Environmental Center**	A campus sustainability officer will cost the College $38-$45,000/year. The other action items listed would only require staff time. **Benefit/Payback Period** A campus sustainability officer would make the entire plan more effective and help FLC capture potential savings in the plan.

	Further develop a campus sustainability web portal linked to the FLC homepage	**Environmental Center**, IT, Enrollment Services	

Rationale

In discussing staffing and financing for sustainability on campus, we reviewed various functions that need attention for sustainability to succeed at Fort Lewis. We list these functions and concrete examples in the table below.

Function	Example
Monitoring and reporting	GHG reporting, recycling statistics, and action plan targets
Campus outreach and training	Education programs, class presentations, staff training, routine questions
Technical Management & Oversight	Energy management, technology review, green building and contract review
Marketing and fundraising	Sustainability website maintenance, publications, and donor contacts
Networking	With city and county staff, campus groups, community orgs, and other campuses
Planning and Policy	Update of action plan, development of specific plans and policies, PACEA
Coordination and communication	Coordination of all of the above activities

We felt there are existing structures on campus that could provide all of these functions an effective home except for the coordination and communication function and this became the focus of discussion.

We evaluated three scenarios in parceling out these responsibilities

- PACEA leadership – This was the "no new staff" option. It depended on a faculty chair for PACEA receiving release time to coordinate data collection on the Sustainability Action Plan and active subcommittees organizing activities on various aspects of

the plan. This would necessitate a dramatic shift in the role of PACEA. While this option would promote teamwork, it would also pose a significant challenge in coordinating activities across campus and making sure that details do not get lost.

- Climate Change Officer – This scenario would assign a staff member to reduce our greenhouse gas emissions by taking charge of energy use and alternative transportation programs on campus. This person would have technical expertise and would be housed in Physical Plant. The Environmental Center would continue to handle the campus outreach and non-technical sustainability monitoring and reporting. This scenario relies on shared coordination for the action plan between the Center and this new staff position.

- Campus Sustainability Officer – This is the scenario would create a campus sustainability officer that would provide broad leadership on campus sustainability. This is the scenario most campuses have chosen, though there are different ways to cast the responsibilities of such an office. One danger in creating a sustainability office is that it can discourage broad engagement of the entire campus as people think about "sustainability" as the responsibility of that designated office.

The committee came to a consensus that having a Campus Sustainability Officer (CSO) was the best option so long as the role was cast in terms of facilitating broad participation of the campus rather than implementing a narrow set of technical objectives. There was concern that having a sustainability officer could diminish the strong tradition of student leadership and involvement in direction setting on these issues.

Following the lead of other campuses, we felt that creating work groups with student involvement would be productive way to proceed. There would be a work groups for each of the six sections of the action plan and would allow the people involved in that section to talk with each other and review their progress. The group would meet perhaps twice a semester. This would be a good way to keep students involved in decision-making. The CSO could be the liaison between the work groups and higher decision-making bodies such as PACEA. Each group could have its own chair, who could perhaps be a member of PACEA. In collecting final feedback on this plan, the Environmental Center invited individuals and departments directly connected with each portion of the plan to meet and discuss goals, targets, and action steps as a group. In lieu of a Campus Sustainability Officer, the EC can continue to pull these groups together once a year.

There was debate within committee and PACEA about the best place to house a sustainability officer. Some felt that an officer could function effectively within the office of Institutional Research and Strategic Planning and that the large amount of monitoring and data collection required by the action plan would make this a good fit, especially if sustainability became a part of the next strategic plan. . Others felt that a Campus Sustainability Officer should report directly to the President. In either case, the Campus Sustainability Officer would chair PACEA and meet regularly with the President to create the agendas for PACEA meetings based on the specific

issues on which the President would like advice. The committee felt the person in this position should have strong facilitation and communication skills and should be more of a people person than a technician.

While the committee identified the Campus Sustainability Officer as the best long-term solution, in the short-term, with the current hiring freeze and economic crisis, an interim staffing plan is necessary. PACEA discussed the following options:

- a larger student sustainability fee to support this position
- outside grant money
- a shared position with other institutions in the County
- contracting with someone to manage our sustainability needs on a short-term basis
- purchasing release time for a faculty representative on PACEA to take on coordination role
- providing additional funding for the Environmental Center to continue its short-term coordinating role

There have been no decisions, but the Environmental Center will continue to serve a coordinating role in a very limited capacity.

Objective 2.2: Support faculty and staff who wish to integrate sustainability into their work and the work of their department

Potential Indicators	Chosen Indicators
Number of meetings with staff and faculty Faculty and staff seeking help integrating sustainability into their work # of positions at FLC with responsibilities linked to sustainability	Number of meetings with staff and faculty # of faculty and staff seeking help integrating sustainability into their work

Rationale

The committee felt that to integrate sustainability into employees' day-to-day work the College needs to provide specific support. Ideally, the education and engagement section of the plan will increase the number of employees seeking this assistance. Over time, the hope is that responsibilities related to sustainability become codified in job descriptions and policies for the institution.

Current Situation at FLC	Targets at Other Schools
The Environmental Center occasionally receives phone calls from offices on campus seeking more information about how they become more sustainable. Students are interested in doing departmental audits and this could tie in with the energy conservation campaign outlined in the energy section of the plan. These individual efforts, however, have not become institutionalized in the job descriptions for the institution. Until this year campus sustainability was not explicitly integrated into the job description of any position on campus. Even the EC coordinator position did not identify campus sustainability as an aspect of the position. The EC Coordinator has since revised his job description.	University of Victoria – Office of Campus Planning and Sustainability coordinates work groups to address sustainability issues and meets with departments to orient them to their action plan. UCSB – Their plan recommends that sustainability become integrated into existing job descriptions Stanford – Has topical teams and cross-functional teams such as Evaluation and Reporting. Each team has a mission and a separate chair. Yale – Has a sustainability leaders program with reps from 33 departments who meet monthly and advocate for sustainability in their departments. UBC – Sustainability coordinators in departments across campus work 2 to 4 hours per month on sustainability issues and advocate for greater awareness within their department. UCCS – Working to create a departmentally-based sustainability award

Five-year Target	Actions to Achieve Target	Responsible Parties	Cost/Resources Needed
All the staff positions with assignments under the Sustainability Action Plan feel supported.	Complete an audit of the labor costs for implementation of the action plan and where appropriate identify offsets with employees and department heads	**Environmental Center**	There is no cost to the college for these actions beyond the time necessary to do this type of assessment. **Benefit/Payback Period**

	Meet with employees with assigned tasks under the action plan and identify needed support. Assemble work groups comprised of staff, faculty, and students to lead implementation of different sections of the action plan	Environmental Center, **Campus Sustainability Officer** Environmental Center, **Campus Sustainability Officer**	The benefit for these actions will come in gaining lasting participation in sustainability initiatives across campus.

Rationale

At a practical level, if sustainability becomes simply "another add-on" to staff and faculty's workload, the plan will not be successful. Finding ways to integrate sustainability into what the staff already does on a day-to-day level is essential. This is a shift, however, that needs to happen over time and so the initial target is simply to ensure that positions impacted by the action plan have the necessary support. The first step in this process is to complete a time/labor audit for all the listed actions and then sit down with the specific employees and heads of affected departments to understand how to minimize the impacts of these assignments. The Environmental Center has completed an initial audit. A Campus Sustainability Officer could spend more time with departments to discuss how to free staff time for the tasks listed in this plan.

Participation in work groups would be the highest level of involvement for staff, but it will likely take a couple of years to understand which staff positions are the most important to involve in to serve on various work groups. At that point, a department could formalize this participation within a job description. There could also be more day-to-day ways to integrate sustainability into individual's job responsibilities. For example, the campus is already establishing protocols with regard to cleaning products and the new EHS office is working to integrate health and safety concerns into regular operations.

Goal 3: Increase understanding of sustainability-related decisions and their connection to the overall well-being of the institution

Objective 3.1 Establish a clear understanding of the financial costs, benefits, and risks to the institution of all decisions related to sustainability

Potential Indicators	Chosen Indicators
# of sustainability initiatives that have undergone a financial review Accessibility of financial assessment of sustainability initiatives Survey responses	# of sustainability initiatives that have undergone a financial review
Rationale It's difficult to measure understanding across the FLC community, especially with regard to financial assessment. Eventually, this understanding might come out in a survey or focus group, but initially it seems setting up and using a financial review process is the most straightforward measurement to take.	

Current Situation at FLC	Targets at Other Schools
This plan is the first systematic attempt to judge the relative value of different sustainability initiatives at the College.	UC-Santa Cruz – Holds an annual Campus Earth Summit.

Five-year Target	Actions to Achieve Target	Responsible Parties	Cost/Resources Needed
Create a report providing a holistic financial assessment of sustainability actions	Complete an audit of the cost of the actions identified within the Sustainability Action Plan Set up a simple step-by-step	**Environmental Center** **Campus Sustainability**	No resources outside of staff time are necessary to achieve this target. **Benefit/Payback Period**

	method to do a financial review of a sustainability initiative. Post an FAQ section on the Sustainability Web Portal describing the financial assessment of various sustainability initiatives.	**Officer** and Vice President for Business and Finance **Campus Sustainability Officer** and Vice President for Business and Finance	The benefit in working on this target is helping others see the broad institutional benefits that can come from sustainability initiatives.
Rationale This objective is essential, not only for the financial health of the institution but also in justifying support for sustainability initiatives at a time when resources are so scarce. The hope is that sustainability initiatives can save the College money and so at the very least prove to be cost neutral. Ideally, departments that on the surface appear to have little connection to sustainability would see some of this savings. Setting out objective 3.1 will force a careful accounting of everything in the plan. The Environmental Center has completed an initial audit of the plan's costs, but there is missing information that could help the College make decisions.			

Objective 3.2 – Incorporate ongoing assessment, reflection and adaptation to current conditions into the decision-making process around sustainability

Potential Indicators	Chosen Indicators
Lesson learned reported by individuals and groups involved in implementing the Sustainability Action Plan Reports of key students, staff, and faculty involved in implementation	Reports of key students, staff, and faculty involved in implementation
Rationale This objective is almost impossible to measure with numbers. Self-reports or a focus group among the people most closely involved in implementing the plan would be a more reliable way to measure this objective.	

Current Situation at FLC	Targets at Other Schools
Creating this plan is providing a productive space for reflection on how the College makes decisions related to sustainability. PACEA also has provided this outlet in the past.	Most schools have an annual review or report, but we did not find any other schools who explicitly state institutional learning as an objective.

Five-year Target	Actions to Achieve Target	Responsible Parties	Cost/Resources Needed
Provide a description of lessons learned as part of an annual report on the Sustainability Action Plan	Outline mechanisms for work groups to obtain the data they need to evaluate their progress Outline the desired questions work groups should address within their annual report. Collect feedback from members of work group and present this information to PACEA as part of a regular review of progress on the action plan	Environmental Center, **Campus Sustainability Officer** Environmental Center, **Campus Sustainability Officer** **Campus Sustainability Officer**, PACEA	No resources outside of staff time are necessary to achieve this target. **Benefit/Payback Period** The benefit of achieving this target is keeping work on the plan dynamic, interesting, and responsive to changing conditions.

Rationale

This objective speaks to the fact that sustainability is a moving target and that rather than a strictly linear process that moves from plan approval to plan implementation, work on the plan should be iterative. Creating opportunities for collaboration, reflection, and adaptation is an important way to maintain engagement and communication. The committee discussed how, in lieu of a campus sustainability officer, the Environmental Center could take the lead in convening one or more work groups. This will allow the EC to try to establish the mechanisms needed for the groups to evaluate and reflect upon their work.

Objective 3.3 – Engage the campus community in discussion about the College's designated priorities with regard to campus sustainability

Potential Indicators	Chosen Indicators
% of survey respondents able to name our sustainability priorities Attendance at annual sustainability town hall event	% of survey respondents able to name our sustainability priorities
Rationale Since the priorities of the College represent a fairly discrete piece of information, it seems a survey question is the best way to monitor this indicator.	

Current Situation at FLC	Targets at Other Schools
In drafting this plan, the Environmental Center has engaged the campus in the first systematic discussion about sustainability priorities. Prior to this initiative, this discussion remained confined to PACEA. The Sustainability Assessment Report completed by Woodard and Curran identified several key recommendations, which provided grist for this planning process.	University of Victoria – Organizes an annual sustainability award program, produces a "report card," and hosts campus dialogue sessions. Yale – Sustainability Office holds monthly breakfast for all groups interested in sustainability. UCCS – Holds quarterly "sustainability spotlight" events, an annual awards ceremony, a newsletter, and bi-annual report.

Five-year Target	Actions to Achieve Target	Responsible Parties	Cost/Resources Needed
25% of survey respondents are able to name the campus' sustainability priorities	Update the preliminary list of campus priorities for the action plan Establish an annual review of sustainability priorities by PACEA	**PACEA** **Campus Sustainability Officer**, PACEA	The total cost for these actions would be $500/year. This would cover a snack buffet for the town hall and printing costs for associated material. Most of the material would stay, however, in electronic form for

	Hold an annual sustainability town hall/public forum that allows for progress reports to the FLC community and that encourages discussion about campus priorities Publish an annual report on the Sustainability Action Plan and post on the sustainability web portal	Environmental Center, **Campus Sustainability Officer** **Campus Sustainability Officer**	posting on the Internet. **Benefit/Payback Period** An annual town hall will provide a forum for engagement and help align the campus around a few key goals.
Rationale The Environmental Center has worked with PACEA to outline a preliminary list of priorities coming from this plan. This list is attached as an appendix to this document. PACEA should review this list on an annual basis and update as needed. There is a great degree of overlap between this objective and objective 3.2 in the Education and Engagement portion of the plan - "Improve access to progress and decision-making related to sustainability." During our discussion, we identified the need for sustainability to come from both the "bottom-up" and a "top-down" in order to succeed. We believe this plan can serve as a common point of reference for these two levels of activity and encourage dialogue. The education portion of the plan suggests a regular town-hall as the most effective way to give progress report to the FLC community. The school could also publish an annual report on the sustainability web portal.			

Goal 4: Provide the resources necessary for the campus to achieve the targets outlined in the Sustainability Action Plan

Objective 4.1 – Secure funding to achieve the targets in the Sustainability Action Plan

Potential Indicators	Chosen Indicators
Annual budget for campus sustainability $$ raised for campus sustainability from outside sources (e.g.	Annual budget for campus sustainability

donations, grants, contracts, etc.) $$ in "seed fund" for sustainability projects Ratio of general fund dollars to outside sources for campus sustainability	

Rationale

The annual budget is the best measure for this objective. Ideally, campus sustainability would not require any money from the general or auxiliary fund of the College and could function entirely on funding from outside sources. This is not realistic, but a goal should be to keep the amount of money from the College as low as possible while still providing adequate resources for implementation of the plan. Investments should be strategic and the College should try to track savings associated with each initiative. This will require identifying line items in budgets across campus that support sustainability or "premiums" the College pays for the more "sustainable choice" (e.g. 100% recycled paper). Staff time is also an important calculation. Providing adequate personnel cannot be separated from the overall sustainability effort. As this plan does make demands on departments, such as Physical Plant, that are already understaffed, the accounting of dollars spent and dollars needed by various departments needs to be transparent.

Current Situation at FLC	Targets at Other Schools
Fort Lewis invests in sustainability in a number of ways. The College is investing in green buildings, energy efficient technology, CFL bulbs, research, and staffing. We do not have a total amount invested over the past several years, though this would be a valuable calculation. The College has just established a sustainability initiative fund as part of the student fee budget. Although, it is very small compared to other "green" student fee programs it provides an opportunity to establish a protocol for sustainability project grants and can increase in the future.	University of Victoria – Director of sustainability has meeting with potential donors as part of their job description. Colorado College – They are seeking to capture savings from sustainability initiatives without prescribing how savings are used. They are establishing a diverse set of funding streams including an Eco-Fund, Sustainability Projects Fund, and Sustainability Investment Fund. Projects under $100K apply for internal funding; over this and they seek outside funding. They have a "carbon offset" option for employees that supports their overall program. UCCS – Has established Sustainability as its own budget line item

Five-year Target	Actions to Achieve Target	Responsible Parties	Cost/Resources Needed
Increase the annual average of investment in sustainability initiatives and programs over the next five years Baseline calculated by using average investment from 2006 to 2009.	Identify the current amount invested in campus sustainability over the last three years. Develop a fundraising plan for the Sustainability Action Plan Develop a diverse portfolio of funding mechanisms to support the Sustainability Action Plan Identify potential grant funds to support campus sustainability Create internal grant programs to provide one-time money for campus sustainability projects Market campus sustainability to the community and potential donors, focusing especially on high-profile success stories Track and publicize sustainability efforts that save the College money	**Environmental Center**, Budget Director, PPS, Student Housing FLC Foundation, EC, **Campus Sustainability Officer** EC, Vice President for Business and Finance, Budget Director, FLC Foundation, **Campus Sustainability Officer** EC, Grants Office, **Campus Sustainability Officer** Budget Director, **VP Business and Finance**, Environmental Center **FLC Foundation**, Campus Sustainability Officer **Campus Sustainability Officer**	Beyond the staff time necessary for these actions the only expenses under this objective would be the design and printing of collateral material to raise funds for campus sustainability initiatives. A few hundred dollars should be enough initially as much of this information could initially be on the sustainability web portal **Benefit/Payback Period** The benefits in terms of funding the Sustainability Action Plan are clear.
Rationale Following the lead of other colleges, Fort Lewis should cultivate a diversity of funding streams for this type of work. We discussed			

the importance of providing a mechanism for one-time money to pilot a number of projects. This would provide an incentive for the program to demonstrate its worthy of being continued or show how it can either pay for itself or find outside sources of funding.

We discussed the potential to establish a revolving loan fund dedicated to sustainability projects that could replenish itself with money saved by a sustainability initiative. This is very popular at other schools. While the committee applauded the principle of identifying projects with a potential financial return to the College, the consensus was that a revolving loan fund wasn't practical at this time for Fort Lewis. The majority of savings at other schools come from energy efficiency and most of these projects will fall under the performance contracting outlined in the energy section of the plan. These savings will be tied up for more than a decade re-paying the capital outlay for the energy improvements. The committee also thought that a small institution such as Fort Lewis, in uncertain economic times, needs to maintain flexibility in its accounts. At larger institutions, these funds can provide an incentive for success and help with tracking of dollars. At smaller institutions such as Fort Lewis, this is less of a problem. There are also benefits to having savings from sustainability measures available for the rest of campus to use. This can build a broader constituency for sustainability measures since it will help everyone's bottom line. The committee felt tracking savings and "telling the story" of how sustainability has financial benefits for the College is very important and will help ensure that sustainability retains its value during the budgeting process.

The plan itself can help the College market its efforts and encourage fundraising specifically for sustainability programs. The plan will also strengthen grant proposals. The committee also felt with improved recordkeeping we should remain open to potentially charging departments for their resource use, such as electricity.

Objective 4.2 – All campus employees possess the knowledge, tools and training they need to implement the Sustainability Action Plan

Potential Indicators	Chosen Indicators
Employees attending campus sustainability training Staff survey of knowledge about the plan Staff questions relative to sustainability and the action plan	Staff questions relative to sustainability and the action plan

Rationale

Rather than "test" the knowledge of staff, the best indicator would be a tracking of questions that come up in individual meetings with staff and departments about sustainability and the action plan. These meetings will make the effort more personal and can serve the double function of assessing training needs and engaging the campus around sustainability. The goal should be the general sense of

familiarity and comfort with campus sustainability as an idea and the action plan in particular.

Current Situation at FLC	Targets at Other Schools
There is currently no staff or general training on campus sustainability provided to FLC staff. The Environmental Center is available to answer questions but both general or specific trainings have not occurred. There is potential for the Environmental Center or a Campus Sustainability Officer to work with Environmental Health and Safety Officer on staff trainings. Finding ways to not add to the load of campus staff is important.	We did not find other colleges that emphasize staff training and technology to support implementation of their action plans. We will do more research to see how other colleges are approaching this.

Five-year Target	Actions to Achieve Target	Responsible Parties	Cost/Resources Needed
Close the primary gaps in knowledge among staff by identified through a baseline assessment	Identify knowledge gaps with regard to the action plan and create a prioritized list for professional development	Environmental Center, **Campus Sustainability Officer**	The primary cost for this objective would be from conference fees and travel. As we don't have a list of the staff development needs, a modest amount for professional development in this area would be $2,000 per year.
	Identify appropriate conferences and trainings to close knowledge gaps and send staff	Environmental Center, **Campus Sustainability Officer**, VP Business and Finance	**Benefit/Payback Period**
	Identify the technology needed to implement the action plan with greatest efficiency	IT, Environmental Center, **Campus Sustainability Officer**	Trainings and conferences can provide knowledge and generate ideas but also give perspective on how FLC compares to other institutions. There would be no direct financial payback, however, from these expenditures.
	Designate aspects of the plan requiring the assistance of outside consultants	**Environmental Center**	
	Integrate campus sustainability into the orientation of new	**Human Resources**, Environmental Center, Campus	

	employees	Sustainability Officer	
Rationale In addition to funding, there are increasingly professional development opportunities for campus sustainability. The national conference for AASHE (Association for the Advancement of Sustainability in Higher Education) will be in Denver in the fall of 2010. Fort Lewis College should have a presence. The plan can help the College identify which of these opportunities are most important to take advantage of. Software, to assist with green purchasing for example, might also be needed to facilitate fulfillment of the plan. A first step to achieve this objective is to catalogue what technology we need and incorporate this into the costs of the plan.			

Coordination and Support – Appendix 1

Implementation Plan – 5/12/09

Introduction

In reviewing the different sections of the Sustainability Action Plan, PACEA agreed that the various goals, objectives, and targets were appropriate for Fort Lewis College for the next five years. To implement the plan, however, the College must:

- decide which action items are most important
- evaluate the feasibility of the entire plan rather each individual section
- allow for the fact that it will likely be three years before the College is able to hire a staff person to coordinate activities in the plan.

Priority Actions

The Sustainability Action Plan has six sections and 45 objectives. Each objective has a five-year target that will require measurement and tracking. There are several recommended action items for each target. PACEA agreed with the Coordinating Committee that general priorities within the plan should be energy conservation and efficiency, waste reduction, education and engagement, and service to region. The College should place emphasis on actions that have little to no cost or that have quick return on investment.

Throughout the plan, where possible, we have assigned a specific cost to the capital and labor necessary to implement each action. Where these numbers are not available we have assigned an estimated the capital and labor costs as high, moderate, minimum, or zero.

In reviewing the actions that have either a high or moderate cost in terms of up front capital or staff time, we have identified action items we feel should be the institution's top priorities and those we feel we can delay because they require too much money or staff time at this time and will not have as great an impact as other actions. These are in the spreadsheet accompanying this document.

Interim Staffing Plans

The Action Plan proposes to magnify the impact of the many individual efforts across campus already taking place by improving coordination and support around sustainability. The Coordinating Committee identified a new Campus Sustainability staff position as the missing element that would allow us to achieve the targets in the plan. This Campus Sustainability Officer would coordinate workgroups for each section of the plan, compile data, and chair PACEA. PACEA agreed that this position would be invaluable, but the budget situation and other financial needs mean that the College must create an interim staffing plan for at least the next three years.

As an organization focused on student training and leadership development, the Environmental Center cannot fill the role of a campus sustainability officer. The EC can, however, try to work with students on specific projects within the plan and help faculty identify campus projects for their classes that contribute to the plan's goals. At the same time, the President has expressed a desire for PACEA to meet less often and for the chair position to pass from the Environmental Center to another member of the group, most likely a faculty member.

The following are recommendations for interim coordination of the action plan:

PACEA Chair

A faculty member takes on the role of chairing PACEA. This person will likely require some form of compensation, such as release time or additional pay. This person will meet with the President at the beginning of each semester to set the agenda for the group and determine the number of meetings necessary. The chair will discuss issues with relevant departments, such as the Environmental Center or Physical Plant, ahead of each meeting. Standing agenda items for PACEA will include:

- setting priorities for the new campus sustainability fund created during 2008-09 as part of student fees
- progress report on Sustainability Action Plan

The PACEA chair will take over reporting on sustainability measures for surveys such as the Peterson's Guide.

Work Groups

The Environmental Center will convene work groups for each section of the action plan once a year to review targets and action steps in the plan. This meeting will facilitate communication and sharing of information and serve to raise awareness of the plan itself as a living document. With a Campus Sustainability Officer, these meetings would take place twice a semester. A single meeting will at least establish this framework and allow the Center to keep track of projects that students and faculty can assist with.

President's Climate Commitment

The Environmental Center will work to identify a class or other student-based experience that can conduct the bi-annual greenhouse gas inventory required by the President's Climate Commitment. The Center will continue to serve as the contact for the President's Climate Commitment.

Sustainability Action Plan Outreach

Outreach about the Sustainability Action Plan will help sustainability become a strategic direction in the next campus strategic plan. Discussion about strategic priorities for the

2012-2017 strategic plan will start next year. The Environmental Center has taken the goal of "Making Sustainability a Community Effort" as one of the five priorities for the Center. As such, the Center's staff and board will initiate outreach to gather additional input on the draft plan and educate the FLC community about the plans goals and objectives. A Campus Sustainability Officer would be able to provide more focus to this outreach effort, but the Center can at least begin this process. If sustainability becomes a strategic direction of the College, additional resources will flow to the action plan.

An initial step in this outreach effort is to meet with each department identified as a "responsible party" in the action plan and secure participation in the annual work group meeting for that section of the plan. These individual meetings will allow for additional feedback and adjustment of the plan.

Timeline

The Environmental Center will work this summer to create a timeline of prioritized actions for the next three years under the assumption that there will not be a Campus Sustainability Officer in place. This timeline will create a framework for continued progress and reporting and help the PACEA chair in working with the President to set the agenda for PACEA meetings. Below is a preliminary timeline for the summer and fall of 2009.

Time Period	Task
May 2009	• Completion of spreadsheet detailing departmental responsibilities for Sustainability Action Plan • Completion of timeline for next three years
June 2009	• Additional research to close data gaps in plan • Individual meetings with available departmental heads about their responsibilities in the action plan • Work on basic FLC Sustainability Website • Contact with Graphic Design Club for creation of a logo and brand for FLC's Sustainability Initiative
July-August 2009	• Draft of an executive summary of action plan completed and posted on the EC and FLC website
September-October 2009	• EC facilitates workgroup meetings for each section of the plan to gather feedback and identify priorities for year. • EC staff and board work to engage community and gather feedback on plan • Executive summary sent to workgroup participants • Completion of logo and brand for FLC Sustainability Initiatives

	• **PACEA meeting to make recommendation on priorities for sustainability fund**
November-December 2009	• Complete design for FLC Sustainability Web Page • Revisions to Sustainability Action Plan based on workgroup and general community feedback • **PACEA meeting to make recommendation on action plan to President**
January 2010	• Submit action plan to President's Climate Commitment

Coordination and Support – Appendix 2

SAP Priority Action Items as of January 2010

Action Item		Responsible Party	Labor Cost	Capital Cost	Funding Source
Priorities					
	Performance contracting - phase 1	PPS	$ 50,000.00	$2,148,450.00	ROI
	Install meters for electricity, natural gas, and water on as many buildings as possible	PPS	High	$5,000/meter	ROI
	Purchase a truck scale to measure solid waste and renegotiate contract to pay for disposal by the pound.	PPS	Mod	$ 60,000.00	Grant, Project Fund
	Real-time energy and water-use displays for campus buildings*	PPS	Mod	??	ROI
	Outreach to campus departments and student groups about the action plan	Environmental Center	High	$ -	??
	Hire a Campus Sustainability Officer (CSO) to coordinate efforts on the action plan	Administration	$ 40,000.00	??	??
	Develop campus sustainability web portal linked to the FLC homepage	Environmental Center, IT	High	$ -	Grant, Green Fee fund
	Install vandal-proof showerheads for use in the resident halls	Environmental Center, Student Housing	Mod	$ 2,200.00	ROI
	Conduct a feasibility study for on-site solar power generation at the Old Fort	Contractor	$ 2,800.00	$ -	??
	Expand use of the new Pathways to Sustainability logo to expand visibility of initiatives on campus.*	EC, FLC Foundation	Mod	??	??
	Commuter Survey; Entrance Counts	Short-term: EC; Long-term: TDM Coordinator, Class, IRSP	$ 7,200.00	$ -	Parking revenue, Work Study Funds
	Create a “free store” with an online catalog (WC, ☼)	Environmental Center	$ 2,000.00	??	Grants, Green Fee, Administration

Coordination and Support - Appendix 3

FLC Environmental Center
Responsibilities Related to Campus Sustainability
2009-2010 Academic Year

Long-Term Responsibilities

- Facilitate student-directed projects that meet campus and community needs
- Facilitate student participation and leadership on campus sustainability issues
- Facilitate student work around education and outreach for campus sustainability
- Work with Center for Civic Engagement to facilitate and evaluate community-based learning and research activities related to sustainability

Additional Short-Term Responsibilities

Ongoing
- Chair PACEA
- Facilitate greenhouse gas inventory and reporting
- Respond to inquiries for information on campus sustainability issues
- Convene workgroups annually to monitor implementation of action plan
- Monitor implementation and handle reporting of the sustainability action plan
- Maintain Pathways to Sustainability Website
- Advise the College on green building projects and priorities
- Contribute to marketing efforts around sustainability

Temporary
- Chair green building education committee
- Assist FAB with establishing Sustainability Fee Initiative program
- Prepare the necessary materials for future Campus Sustainability Officer to succeed

Other Interim Staffing Options

- Hire contractor
- Hire a temporary staff member out of EC office
- Grant-funded temporary position
- Shared staff position with other organizations in town
- Purchase release time for faculty member
- Reassign as many of ongoing short-term responsibilities as possible

Coordination and Support – Appendix 4

DRAFT - Position Description
Sustainability Coordinator

Fort Lewis College is seeking an environmental professional with exceptional communication and coordination skills to assist with oversee its *Pathways to Sustainability* initiative. The Sustainability Coordinator will oversee initial implementation of the College' Sustainability Action Plan and will coordinate dedicated individuals and departments from across campus working to make Fort Lewis College a leader on sustainability issues. The position will chair the President's Council on Environmental Affairs (PACEA), be responsible for tracking and reporting progress on the action plan, and coordinate the College's biennial Greenhouse Gas Inventory. The Sustainability Coordinator will report directly to the President and work closely with the FLC Environmental Center, Physical Plant Services, Student Housing and Conference Services, and the Fort Lewis College Foundation. **This is a part-time, temporary position.**

Primary Responsibilities

- Convene and facilitate the President's Advisory Council on Environmental Affairs (PACEA), including consultation with the President on the agenda
- Facilitate data collection, analysis, and reporting of a biennial greenhouse gas inventory. This includes collecting the following information: commuter data, campus fuel use, energy and natural gas bills, fertilizer used, solid waste produced, and data on official travel.
- Maintain the *Pathways to Sustainability* website
- Facilitate working groups to implement and evaluate progress on the College's Sustainability Action Plan.
- Serve as the contact person and institutional liaison for Fort Lewis College on campus sustainability

Additional Responsibilities

- Publish reports on the College's sustainability programs, including providing the campus with regular progress reports on the Sustainability Action Plan
- Advise the College on green building projects and priorities
- Assist with marketing Fort Lewis College's sustainability efforts
- Seek funding from public and private sources for FLC's sustainability programs

Required Qualifications

- Bachelor's degree in a related field and at least two years work experience with campus sustainability programs and issues
- Demonstrated experience bringing diverse audiences together to achieve long-term goals
- Demonstrated ability to foster and develop positive working relationships with colleagues, college students, and other stakeholders

- Strong commitment to organizational success including a focus on evaluation, organizational learning, and the creation of positive culture within an institution
- Outstanding verbal and written communication, including group facilitation and motivation
- Experience leading campus-wide initiatives at an institution of higher education
- Experience with the U.S. Green Building Council's LEED-NC rating system
- Familiarity with greenhouse gas inventories and reduction strategies

Preferred Qualifications

- Masters degree preferred
- Experience with transportation demand management programs
- Understanding of measures to increase energy efficiency and reduce waste
- Ability to create and maintain a web site
- Grant writing experience

Time: 15-20 hours a week

Annual Salary

$11,000 to $12,500 at 15 hours a week, depending on qualifications and experience
$15,000 to $16,500 at 20 hours a week, depending on qualifications and experience

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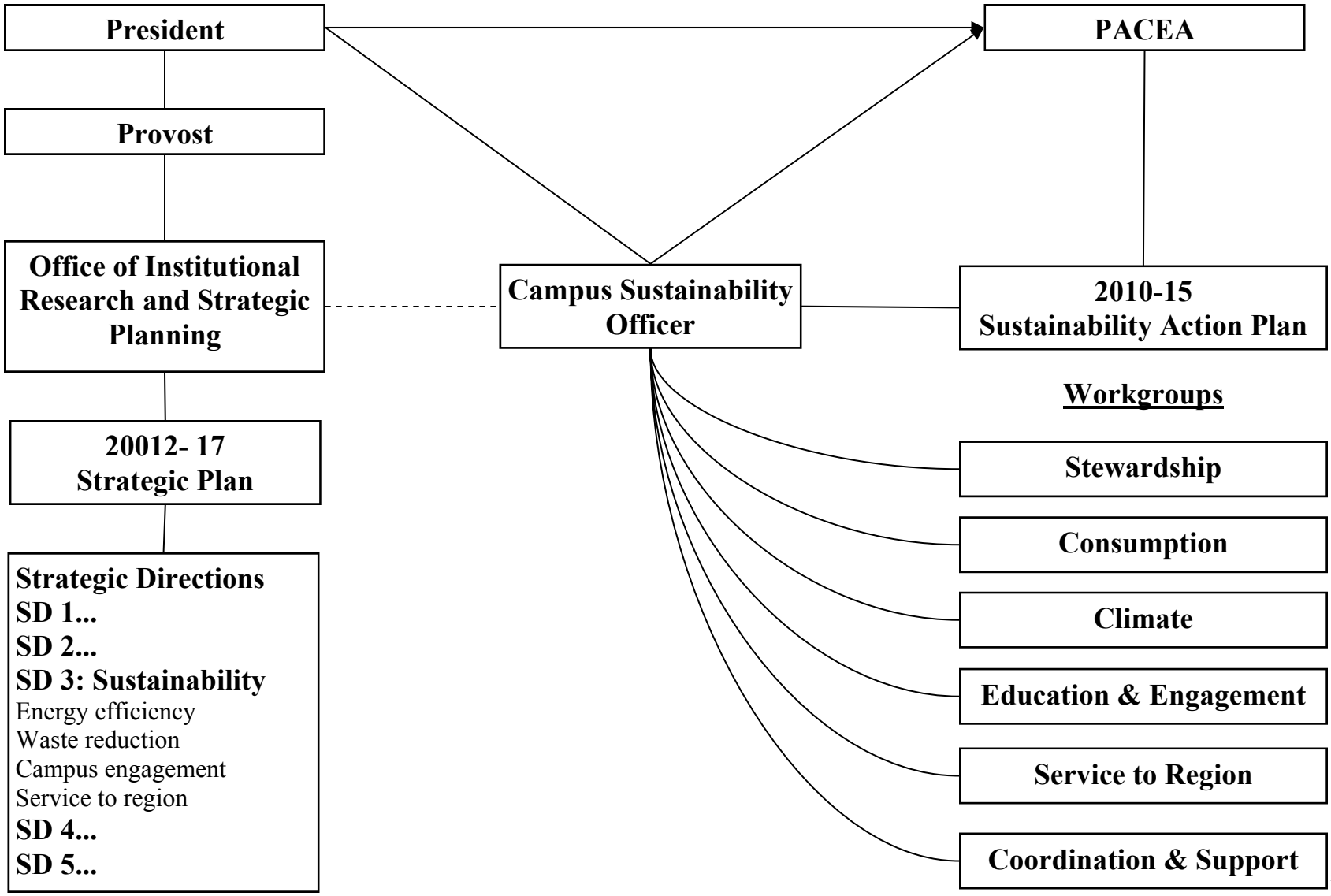
Total annual cost with benefits calculated at 18.5%

$13,000 to $15,000 at 15 hours a week
$18,000 to $19,500 at 20 hours a week

Coordination and Support – Appendix 5

Coordinating Sustainability at Fort Lewis College



Appendices

A. Strategies to Achieve Carbon Neutrality
B. Timeline
C. Greenhouse Gas Reduction Strategies by Topic

Appendix A

Strategies for Achieving Carbon Neutrality

~ Prepared by the Fort Lewis College Environmental Center ~
- 1/13/10 -

Executive Summary

President Bartel signed the American College and University Presidents' Climate Commitment (ACUPCC) on April 6. 2007. This agreement commits Fort Lewis to come up with a climate action plan to achieve carbon neutrality. Colleges and universities across the country are taking up this challenge, each evaluating roughly the same list of strategies relative to their specific context.

The first step in this process is to conduct a greenhouse gas inventory. The Environmental Center worked closely with the consulting firm of Woodard and Curran to complete the College's first inventory in January of 2008. The inventory showed that during FY2006-07, Fort Lewis emitted the equivalent of 15,445 metric tons of CO_2 into the atmosphere. The College's distribution is typical for colleges: 51% comes from electricity, 25% from natural gas heating, 20% from transportation, and 4% from waste, agriculture, and fertilizers.

This inaugural effort was necessarily incomplete. Recordkeeping systems at the College did not allow for measuring the impact of official travel or the contribution of refrigerants or the carbon sequestration of the trees, shrubs, and soils on lands owned by the College. Relative to the overall total, the inclusion of these sources would not have dramatically altered the total. Future inventories will attempt to include this data.

The goal of this document, the climate spreadsheet, and the appendix is to present an initial assessment of the various strategies available to Fort Lewis as it seeks to reduce its carbon count to zero. This document offers some initial recommendations for which strategies to pursue first and what interim milestones the College should aim towards. It's important to realize, however, that while this document seeks reductions in greenhouse gas emissions, there are forces that will push in the opposite direction. The desired increase in enrollment and in the number of students living on campus will increase our emissions. New buildings, while more energy efficient, will increase energy use unless we take older buildings offline. The future will also bring a demand for more powerful computers and servers that will require more energy. It's also difficult to anticipate future changes in government policy and energy prices.

Fort Lewis can work at its own pace in confronting these challenges and uncertainties. This working paper will try to offer a platform for discussion so we can discover the most promising path forward.

Parts 1 & 2 – Energy and Buildings

Seventy-six percent of Fort Lewis College's greenhouse gas emissions relate to energy use and building design and construction. This amounts to the equivalent of 11,662 tons of carbon dioxide. Governor Ritter's Greening Government Executive Order mandates a 20% reduction in energy use by 2012.

We have listed strategies that the College can pursue to meet the Governor's mandate and move toward carbon neutrality. We have divided the spreadsheet into four phases that stretch over the next fifty years. The spreadsheet lists:

- the capital cost of going beyond "business as usual" scenario (marginal capital cost);
- net annual cost or savings for implementing the strategy;
- the payback period;
- the projected lifetime of the project;
- reduction in greenhouse gas emissions;
- dollar value of the strategy, per ton of CO2 removed from the atmosphere. This ratio assesses this value over the entire lifetime of the project.

The equations and values central to these calculations are listed below. The appendix gives a preliminary assessment of all the strategies by topic on which we collected information and lists both our assumptions and our sources. We hope the appendix serves to address most of the questions about the strategies and figures we list in the spreadsheet.

Our fundamental approach is to focus during the first five years on conservation and energy efficiency in order to realize savings that the College can reinvest in strategies that have a longer payback period. The anchor for this first phase is a performance contracting process that will dramatically increase the energy efficiency of existing buildings. In consultation with Physical Plant Services, we estimate a ten percent reduction in energy costs from this process during phase one and an additional five percent reduction during phase two. In the interests of time, we chose not to evaluate the strategies we believe will be part of the performance contracting process, but we still list them in the appendix. Performance contracting allows the savings from the improvements to pay for capital costs, making them cost neutral for the College.

The focus during phase one is also on collecting additional information on the strategies requiring a more significant capital investment. This will position the College to move more quickly during phases two, three, and four. For example, estimates suggest that integrating a ground source heating and cooling system into new building projects could significantly reduce costs and have a quick return on investment. It's impossible to assess, however, without a detailed feasibility study. Collectively, we estimate the strategies in phase one will only reduce energy use between 15-18%, leaving us short of the Governor's energy conservation goal. This underscores the importance of collecting additional information so that the College can employ phase two strategies as quickly as possible.

The recommended strategies will only reduce emissions by 4864 MTCe or just over 40%. Beyond the first five years, there are simply too many uncertainties for us to assert a definite path. To achieve the remaining sixty percent reduction in energy use, we list strategies requiring

additional information under the phase we think they most naturally fall, either because of a connection to another strategy or because of the current state of the technology. We believe these strategies suggest some promising opportunities for the College to explore.

It will not be possible for the College to achieve carbon neutrality without significant investment in one or more of the developing renewable technologies. The question is which ones are the right fit for Fort Lewis College and when is the right time to begin. Biomass gasification and ground source heating offer potential to offset greenhouse gas emissions from heating. Offsetting emissions from electricity is more challenging. Solar applications hold the most promise, but in lieu of grants or government financing, the economics are difficult to manage. Because we are a small college located in a small community, Fort Lewis should seriously consider partnership opportunities with other large institutions in the area. As long as we purchase our electricity from LPEA, their portfolio will have a large impact on our emissions. Helping LPEA incorporate local renewables into their power mix will help everyone, including Fort Lewis.

Answering all of these questions with confidence will require more detailed analysis than we can currently provide. We believe, however, charting the possibilities will be sufficient to meet the requirements of the President's Climate Commitment and that through further discussion the College can choose a provisional course to address climate change over the next half-century.

Part 3 – Transportation

There are two sections to the transportation portion of the climate action plan. The first deals with the GHG impacts of students, staff, and faculty traveling to and from campus. Based on the 2007 commuter survey our current emissions from this source are 2956 MTCe. The second deals with emissions from the FLC vehicle fleet, which accounts for 177 MTCe. It's important to note that the Governor's Executive Order on greening state government mandates a 25% reduction in petroleum emissions from state vehicles by 2012. We outline potential strategies to help the college meet this goal.

Transportation Demand Management

A transportation demand management (TDM) program is a package of strategies designed to reduce single-occupancy vehicle (SOV) trips to campus and influence the mode split (the division of how people travel to campus – drive alone, carpool, public transit, bike, walk, etc.). Campuses implement TDM programs for different reasons: to reduce parking demand, to respond to state mandates, or to reduce their carbon footprint. Almost all programs receive their primary revenue from fees associated with parking and transit passes. Some receive grants for pilot projects.

TDM programs work as a package and breaking out the impacts on the mode split of each particular strategy is extremely difficult. Only a few campuses are attempting to evaluate their programs at this level of detail. All TDM programs exist within a specific context and direct comparisons between TDM programs at different schools should be judicious. Variables such as housing markets, growth patterns, campus geography, public transit infrastructure, and

fluctuating gas prices all have tremendous influence on the mode split. This means even evaluating the influence of TDM programs, especially from an impact-per-dollar-invested perspective, is also difficult

Nevertheless, TDM programs have made a significant difference at a number of campuses. Questions as to which particular strategies are most effective are important to consider. We have used conversations with transit coordinators at schools with some of the best programs to gauge potential costs and impacts of a TDM program at Fort Lewis College and to set five- and ten-year targets for our mode split. From these target mode splits, we have calculated the potential GHG reduction.

An effective TDM program requires information to understand what strategies stand the greatest chance of success. Prior to the Environmental Center's commuter survey in 2007, Fort Lewis did not have any data on commuting patterns. This data is also a self-reporting of behavior rather than an actual traffic count. Considering campus police currently has only one registered carpool, the survey results for carpooling seem especially high (see below). We feel the most prudent approach is to spend the first five years (phase one) focused on collecting additional data, promoting existing services and programs, and implementing a few low-cost but highly visible initiatives. We feel this will yield modest reductions in GHG emissions, roughly 187 MTCe, but will set the stage for larger reductions during phase two.

The key strategy during phase two is the implementation of an aerial tramway connecting Fort Lewis College with downtown Durango. Fort Lewis would be only the second institution of higher education in the country to use a tramway and this is reflected in a jump of 13% in the use of public transit between phase one and phase two. With the tramway we believe a reduction of 712 MTCe is possible during phase two, resulting in a 34% reduction in GHG emissions over ten years.

Mode	Current*	Phase 1 Target	Phase 2 Target
Drive alone	41%	37%	20%
Carpool/Vanpool	18.6%	19%	21%
Public Transit	7.6%	9%	22%
Bike	10.3%	11%	13%
Walk	22.5%	24%	24%
Total	100%	100%	100%

* Based on the Environmental Center's commuter survey during the fall of 2007 (15% response rate). This survey included students living on campus. This is common, but not universal in commuter surveys, making our numbers difficult to compare to other campuses.

Beyond ten years, we hope an evolution in vehicle technology will result in additional reductions. There will likely always be some emissions associated with getting to campus and so a portion of these will need to be offset by other means. Finally, there are a number of TDM strategies that we do not recommend for FLC and we list these at the end of the appendix.

We believe the College can cover the relatively modest costs of a TDM program through increases in parking revenue so that net impact on the College's budget should be neutral. The recent parking study for FLC recommended an increase in parking rates to $150 a year along

with other measures, which would generate over $200,000 in additional revenue. The College has not decided whether to implement this recommendation; if it does raise parking fees, additional revenue is needed to more effectively run parking services. But a portion could go toward developing a TDM program. Providing TDM programs and services as part of an increase in parking will help the FLC community understand the impacts of vehicle transportation and accept the need for increased rates.

As relayed by Celeste Gilman, a transit coordinator at the University of Washington, which has perhaps the top alternative transit program in the country, the goal is to make the perceived value of the new greater than the value of the old minus the perceived cost of change. Because finding the right mix of parking rates and transit incentives is critical, we recommend that as part of phase one the College hire a consulting firm to analyze the transit situation at FLC and recommend TDM strategies for the College to pursue. Students projects through the EC and academic classes can collect much of the information we need, but we believe analysis from individuals with direct experience in transportation planning for college campuses is a worthwhile the investment.

Fleet Management

In terms of managing the fleet, we feel the strategy with the greatest potential is to create a small closed-loop biodiesel production facility on campus. Appalachian State completed a successful and cost-effective demonstration project that leads us to believe such a facility is feasible at Fort Lewis College. Our excellent chapter of Engineers Without Borders could especially benefit from taking on such a project.

We have also analyzed the potential emission reductions from replacing fleet vehicles over time with models that use alternative fuels. Because of the highly dynamic nature of the alternative vehicle marketplace, this analysis simply provides snapshot in time and allows one to see what reductions are currently possible in our vehicle fleet. This analysis shows using current technology it is possible to reduce emissions by 67 MTCe/year or 38%. Because complete turnover of the fleet will take decades we include these reductions in phase three of the plan. We hope that additional and more affordable options will soon be available.

Part 4 – Other Sources

We have briefly summarized emission reductions from other sources such as a reduction in waste, fertilizers, and an increase in composting. These reductions are not insignificant. Reducing waste per capita especially has the potential to reduce our carbon foot print by over 300 MTCe per year and save the college money. More detailed information on these strategies is in the appendix.

Conclusion

Using the strategies that we have enough information to fully assess, the College can reduce its greenhouse gas emissions 44% over the next fifty years. While a significant improvement, it falls well short of the 80% reduction by 2050 that most scientists say is necessary for society to avoid the worst impacts of the climate crisis. Given the information available, we estimate another 44% reduction is possible using the additional strategies we've listed as requiring additional study. These estimates are less precise and we need more information to accurately assess their impacts and costs. Finally, to reach a carbon neutral position, some purchase of renewable energy credits will be necessary. In our spreadsheet we estimate that we will need to offset 12% of our emissions with these purchases.

This research charts a course for the College to follow. Additional research, new technology, and rising costs associated with carbon emissions will likely alter the recommendations in the College's next climate plan. But this report gives the institution a place to start.

Interpreting the Climate Spreadsheet

Marginal Capital Cost = Difference between "business as usual" and additional funds required for greenhouse gas reductions

Net Annual Savings = Annual savings minus annual operating costs

Pricing based on FY2006-07 Utility Bill for FLC
- $0.0685/kWh for electricity
- $8.11/MMBtu for natural gas

We did not assume rising energy rates since these are difficult to predict

Payback Period = Marginal Capital Cost/Net Annual Savings

Rate of Return = Net Annual Savings/Marginal Capital Cost

Annual GHG Reduction based on Clean Air-Cool Planet Calculator
- 1451 kWh = 1 MTCe
- 18.89 MMBTu = 1 MTCe

$$/MTCe = Net Present Value/Lifetime GHG Reduction

$$\$/MTCO_2e = \frac{(Total\ NPV)}{(Total\ years\ of\ project)} \cdot \frac{1}{Annual\ MTCO_2e\ avoided}$$

$$Total\ NPV = -(Capital\ cost) + (Annual\ savings) \cdot \frac{(1+r)^n - 1}{r(1+r)^n}$$

Where r = discount rate, and n = total years of project

Discount rate = 0.06 or 6%. This accounts for the opportunity cost of investing in GHG reduction versus another form of revenue generating investment. Usually this is linked to the short-term Treasury Rate. We found that several other schools used six percent as their discount rate. Even though interest rates are now much lower, we want to be conservative in evaluating the values of greenhouse gas reductions.

Appendix B - Timeline

FLC Climate Strategies - Energy and Buildings

Reduction Target = 15,545 MTCe
equals transportation strategy

Phase One: 1-5 years	Marginal Capital Cost	Net Annual Savings	Payback Period	Rate of Return	Lifetime of Project	Annual GHG Reduction	$$/MTCe Ratio
Install low-flow showerheads	$ 2,200.00	$ 16,116.00	0.14	733%	15 years	53	$194
Reducing synthetic fertilizer use by 50%	$ 1,000.00	$ 2,000.00	0.5	200%	25 years	7	$140
Composting 5% of college waste stream	$ 2,000.00	$ 1,000.00	2.00	50%	25 years	5	$86
Vending misers on vending machines	$ -	$ 9,480.00	Immediate	Immediate	10 years	95	$73
Put FLC computers into sleep mode	$ -	$ 23,822.00	Immediate	Immediate	25 years	240	$51
Energy conservation outreach program	$ 3,000.00	$ 16,865.92	Immediate	Immediate	25 years	190	$45
Performance contracting - phase 1	$ 2,198,450.00	$ 133,230.00	16.50	6%	25 years	1166.2	-$17
Produce biodiesel on campus	$ 20,000.00	$ 1,525.00	13.11	8%	25 years	11.81	-$2
TDM Program - Phase 1	$ 30,000.00	$ (21,208.00)	NA	NA	25 years	187	-$64
TDM Coordination and Management	$ -	$ (7,200.00)	NA	NA	25 years	NA	NA
Outreach campaign	$ -	$ (2,000.00)	NA	NA	25 years	NA	NA
Carpool program - preferential parking	$ -	$ (4,000.00)	NA	NA	25 years	31	-$66
Reduced parking rates for low-emission vehicles	$ -	$ -	NA	NA	25 years	NA	NA
Emergency Ride Home	$ -	$ (780.00)	NA	NA	25 years	NA	NA
Transit passes for staff	$ -	$ (6,228.00)	NA	NA	25 years	98	-$32
Commute Club Incentives	$ -	$ (1,000.00)	NA	NA	25 years	NA	NA
Bike registration	$ -	$ -	NA	NA	25 years	NA	NA
Showers and lockers access for cyclists	$ -	$ -	NA	NA	25 years	NA	NA
Expand OP bike checkout program	$ 20,000.00	$ -	NA	NA	25 years	5.5	-$242
Facilitate self-maintenance of bikes	$ -	$ -	NA	NA	25 years	NA	NA
Bike clinics and workshops	$ -	$ -	NA	NA	25 years	NA	NA
Parking management strategies	$ -	$ -	NA	NA	25 years	NA	NA
Meeting waste and diversion targets from plan	$ 3,500.00	$ -	NA	NA	25 years	351	-$4
Increased res hall efficiency - Animas, Elbert, Fremont	NA	NA	NA	NA	50	535	NA
Old Fort solar farm feasibility study	$ 2,800.00	NA	NA	NA	NA	NA	NA
Old Fort solar farm through a PPA	$ -	NA	NA	NA	20 years	NA	NA
Transportaiton program feasibility study	$ 20,000.00	NA	NA	NA	NA	NA	NA
Total	$ 2,282,950.00	$ 182,830.92	12.49	8%		2,841	

Phase One Strategies Requiring Additional Information

Ground source feasibility study	$ 60,000.00	NA	NA	NA	NA	NA	NA
Ground source system for Elbert and Fremont	$ 92,742.00	$ 18,340.00	5.06	20%	30 years	169	$32
Forest sequestration	$ -	$ -	NA	??	30 years	??	??
Equipment efficiency turnover	$ -	??	??	??	10 years	??	??
Cluster room scheduling in summer	??	??	??	??	30 years	??	??
Reduce lighting	??	??	??	??	30 years	??	??
Improve efficiency of pool	??	??	??	??	30 years	??	??
CFL loan/giveaway program	$ 3,390.00	$ 2,842.00	1.19	84%	7 years	28.6	$62
Total	$ 96,132.00	$ 21,182.00	4.54	22%		197.6	

Phase Two: 6-10 years	**Marginal Capital Cost**	**Net Annual Savings**	**Payback Period**	**Rate of Return**	**Lifetime of Project**	**Annual GHG Reduction**	**$$/MTCe Ratio**
Performance contracting - phase 2	$ 1,665,375.00	$ 66,615.00	25.00	4%	25 years	583.1	-$56
Solar hot water system for Cooper Hall	$ 47,742.00	$ 1,759.00	27.14	4%	30 years	12	-$65
Increased res hall efficiency - Baldy Hall	NA	NA	NA		NA	126	NA
TDM Program - Phase 2	$ 70,000.00	$ (17,250.00)	NA	NA	25 years	712	-$16
Vanpool program	$ -	$ (7,750.00)	NA	NA	25 years	13	-$305
Create a more effective rideshare program	$ -	$ (4,500.00)	NA	NA	25 years	NA	NA
Begin a carsharing program	$ -	$ (2,000.00)	NA	NA	25 years	NA	NA
Aerial Tramway	$ -	$ (1,000.00)	NA	NA	25 years	616	-$1
Additional bus services for FLC riders	$ -	$ -	NA	NA	25 years	NA	NA
Covered bike parking on campus	$ 50,000.00		NA	NA	25 years	NA	NA
Bicycle shuttle	$ 20,000.00		NA	NA	25 years	163	-$5
No-interest loan program for bicyles	$ -	$ (2,000.00)	NA	NA	25 years	NA	NA
Flexible scheduling	$ -		NA	NA	25 years	35	$0
Total	$ 1,783,117.00	$ 51,124.00	34.88	3%		1,433	

Phase Two Strategies Requiring Additional Information

Study: buiding improvements not covered by performance contracting	NA	NA	NA	NA	NA	NA	NA
Study: costs and feasibility of microhydro system using campus wastewater	NA	NA	NA	NA	NA	NA	NA

Grround Source Heat System for Baldy, Animas Halls	$ 133,753.00	$ 26,449.00	5.06	20%	30 years	235	$33
Solar film on windows to cut cooling costs	??	??	??	??	20 years	??	??
Charging departments for their energy use	??	??	??	??	40 years	??	??
Design data center into new building to capture heat of computer servers	??	??	??	??	40 years	??	??
Improve energy efficiency of phone system	??	??	??	??	20 years	??	??
Install small wind turbine at Old Fort campus	$ 40,000.00	??	??	??	30 years	??	??
Total	$ 173,753.00	$ 26,449.00	6.57	15%		235	

Phase Three: 11-20 years	**Marginal Capital Cost**	**Net Annual Savings**	**Payback Period**	**Rate of Return**	**Lifetime of Project**	**Annual GHG Reduction**	**$$/MTCe Ratio**
Solar hot water system for Student Life Center and Pool	$ 150,420.00	$ 5,579.00	26.96	4%	30 years	37	-$66
Increased Res Hall Efficiency - Cumberland, Diorite Halls						254	
Vehicle Fleet Turnover							
Passenger van turnover - Ford Econoline E-150 – FFV	$ (58,886.00)	$ (5,475.00)	11 years	9%	3 years	13	$1,177
Utility van turnover - Dodge Grand Caravan	$ (60,470.00)	$ (1,959.00)	31 years	3%	15 years	3	$950
Light pickup turnover - Zap XL Electric Truck	$ 37,200.00	$ 8,381.00	4.4 years	23%	15 years	14	$208
Heavy pickup turnover GMC Sierra 2500HD (B100)	$ (1,840.00)	$ (16,547.00)	NA	NA	15 years	13	-$776
Passenger car turnover - Volkswagen Jetta TDI (B100)	$ (2,980.00)	$ (152.00)	20 years	5%	15 years	4	$45
Patrol car turnover - Chevrolet Impala - FFV	$ 4,758.00	$ (2,009.00)	NA	NA	15 years	10	-$202
Golf cart turnover - Columbia SUV-S Electric	$ 1,085.00	$ 335.00	3 years	31%	15 years	0.25	$592
Total	$ 69,287.00	$ (11,847.00)	-5.85	-17%		348	
Phase Three Strategies Requiring Additional Information							
Switch heating to biomass gasification	$ 6,000,000.00	$ 429,798.00	13.96	7%	30 years	3812	-$1
Ground Source Heat System for Cumberland, Diorite Halls	$ 75,519.00	$ 14,934.00	5.06	20%	30 years	133	$33
Building improvements not covered by performance contracting	??	??	??	??	30 years	??	??
Replace single-pane windows	??	??	??	??	30 years	??	??
Micro-hydro system using FLC wastewater	??	$ 1,836.00	??	??	30 years	18	??

Methane digester at the Old Fort	$ 1,182,587.00	??	??	??	30 years	231	??
Solar-powered parking & pathway lighting	??	??	??	??	30 years	??	??
Total	$ 7,258,106.00	$ 446,568.00	16.25	6%		4194	

Phase Four: 21-50 years	**Marginal Capital Cost**	**Net Annual Savings**	**Payback Period**	**Rate of Return**	**Lifetime of Project**	**Annual GHG Reduction**	**$$/MTCe Ratio**
Solar Farm at the Old Fort Property - purchase after 20 years of use as part of a power purchase agreement	$ 3,850,000.00	$ 213,734.00	18.01	6%	20 years	2151	-$33
Total	$ 3,850,000.00	$ 213,734.00	18.01	6%		2151	
Phase Four Strategies Requiring Additional Information							
Second Solar Farm at the Old Fort Property	$ 11,000,000.00	$ 213,734.00	51.47	2%	40 years	2151	-$90
Concentrated Solar Facility at the Old Fort	??	??	??	??	30 years	??	??
Hydrogen Fuel Cell Technology	??	??	??	??	30 years	??	??
Expansion of ground source system	??	??	??	??	30 years	??	??
Buiding improvements not covered by performance contracting	??	??	??	??	30 years	??	??
Total	$ 11,000,000.00	$ 213,734.00	51.47			2151	
Totals Phases 1-4	**$ 7,985,354**	**$ 435,842**	**18.32**	**5%**		**6,773**	
Percent Reduction in GHG Emissions						**44%**	
Total Additional Strategies	**$ 18,527,991**	**$ 707,933**	**26.17**	**4%**		**6777.6**	
Additional Percent Reduction						**88%**	

To achieve the final 12% reduction, the College could purchase Renewable Energy Credits

Appendix C

Greenhouse Gas Reduction Strategies by Topic

Part 1 - Energy Use

Lighting
- More efficient lights bulbs, fixtures, reflectors
- Occupancy sensors in buildings and parking lots
- CFL giveaway to incoming students
- Reduce lighting
- Solar-powered parking and pathway lighting

Computers
- Set all FLC computers to go into sleep mode after 20 minutes
- Educate students about "sleep" functions on their personal desktop or laptop
- Improve Energy Efficiency of Servers and Network Technology
- Purchase more efficient computers

Energy Efficient Equipment
- Install vending misers on vending machines
- Implement Energy Star™ purchasing policy
- Improve the efficiency of our phone system
- Improve efficiency of pool pump in Aquatics Center

Heating, Ventilation, and Cooling Systems
- Replace and calibrate thermostats
- Re-commission buildings
- HVAC Heat Exchanger/Recovery for air intake
- Optimize use of EMS system
- Replace inefficient boilers and domestic water heaters
- Install occupancy sensors to adjust HVAC system when people leave the room
- Upgrade HVAC air handlers
- Cluster room scheduling in summer to reduce cooling loads

On-Site Generation of Renewable Energy
- 2MW Solar Farm at the Old Fort property
- Concentrated Solar Power Plant at the Old Fort property
- Solar panels on existing buildings
- Solar thermal systems on campus
- Small wind system for the Old Fort property
- Microwind turbines on existing buildings
- Microhydro system using FLC's wasterwater
- Geothermal heating system
- Biomass gasification heating system

- Landfill-Gas-to-Energy project
- Anaerobic methane digester

Human Behavior
- Campus-wide energy conservation campaign
- Charge departments for their energy use

Part 2 - Buildings

- Install low-flow showerheads
- Set aggressive energy targets on new buildings
- Window replacement
- Add solar film to windows
- Improve weatherization and insulation of existing buildings

Part 3 - Transportation

Transportation Demand Management – Phase 1
- Coordination of a Transportation Demand Management Program
- Outreach campaign to reduce single-occupancy vehicle trips and promote alternative transportation
- Parking management strategies
- Provide incentives to encourage carpooling
- Provide incentives to encourage use of low-emitting vehicles
- Provide emergency rides home for commuters not using cars
- Expand transit pass program to FLC staff
- Provide incentives for using the Durango T
- Provide a bike registration program
- Provide access to showers and lockers for bike commuters
- Cycling incentive program
- Expand Outdoor Pursuits bicycle check-out program
- Facilitate self-maintenance of bicycles
- Bike clinics and workshops
- Provide incentive to encourage walking to school

Transportation Demand Management – Phase 2
- Create an FLC vanpool park-and-ride system from outlying locations
- Create a more effective rideshare program
- Begin a carsharing program
- Support aerial tramway project
- Assist Durango T in improving services for FLC riders
- Provide covered bike parking
- Bicycle shuttle to get cyclist up to the hill
- Facilitating bicycle purchase
- Flexible scheduling

Fleet Management
- Reduce use of fleet vehicles
- Use alternative fuel whenever possible in the vehicle fleet
- Produce biodiesel on campus
- Replace the current vehicles with alternative fuel or higher-efficiency models

Not Recommended
Bike repair and tune-up services
Establish a "yellow bike" program for Durango and FLC
Provide a campus shuttle to complement Durango T service
Banning first-year students from bringing cars to campus

Part 4 - Other GHG Sources and Offsets

- Encourage videoconferencing
- Reduce waste send to the landfill
- Increase composting
- Reduce use of fertilizers
- Carbon sequestration on campus lands
- Purchase Renewable Energy Credits

Energy Use

Lighting

More efficient lights bulbs, fixtures, reflectors **Phase 1, 2**

We have installed CFLs in almost all the locations that take them. Further work requires replacing fixtures to accommodate high efficiency bulbs. The possibilities and benefits of LED lights, which are more efficient than CFLs is worth exploring. Efficient lighting has some of the shortest paybacks.

Assumptions

Any necessary upgrades would take place as part of the performance contract.

Occupancy sensors in buildings and parking lots **Phase 1, 2**

These sensors can dramatically reduce lighting costs. These exist in some new buildings already. Our outdoor lights are on timers to correspond with the amount of daylight.

Assumptions

Widespread installation of occupancy sensors would take place as part of the performance contract.

CFL giveaway to incoming students **Phase 1 - Study**

Many schools give away CFL bulbs to students living on-campus for lights and lamps they bring from home. Such a program would be cost effective if the light was returned as part of check out at the end of the year and then stored for following fall, but Student Housing feels such a program would be difficult to manage. LPEA might be willing to donate CFL bulbs each year under the assumption that those students will move off campus and remain in their service area. A sample of how many personal lamps in the residence halls will take CFL bulbs is the first step to implementing such a program.

Recently, the staff has expressed concern about the impacts of production and disposal of CFL bulbs. They would like more information on these impacts before including CFLs as a recommended strategy.

Assumptions

1330 students live on campus
20% of bulbs would not fit in students' lamps and would be stored for later use
Students use lamps four hours/day for 210 days/year
Purchasing in bulk, CFLs would cost @$3.00/bulbfor 100 watt equivalents

Sources

Climate Action Plans: Middlebury, University of Florida
Press Releases/Websites: Swarthmore College, University of Kentucky, Tufts University

Reduce lighting **Phase 1 - Study**

Without a detailed nighttime inventory of lighting on campus, we do not believe there are larger opportunities to reduce lighting on campus, but we feel it would be good to study this further. New lighting technologies might allow the College to reduce the power necessary to light the athletic fields at night and reduce light pollution. Light Structure Green™ uses reflectors to target outdoor lighting more effectively and claims that their system saves approximately 10,000 kWh and $2,400 per year. LPEA might be able to help us install and experiment with more efficient outdoor lighting.

Sources:

Light Structure Green™ website -
http://www.musco.com/permanent/lightstructuregreen.html

Solar-powered parking and pathway lighting **Phase 1 - Study**

We found two schools (Yale University and Babson College) that are piloting solar-power lighting for campus pathways. They are working with a company called SolarOne™. These systems are entirely off-grid and use batteries to ensure adequate nighttime lighting even during prolonged periods of overcast weather. The sales representative said that they could install a demonstration unit for $3,900. The Town of Ignacio is using some solar powered pathway lighting.

Sources:

Press releases: Babson College, Yale University
SolarOne™ website - http://www.solarone.net/

Computers

Set all FLC computers to go into sleep mode after 20 minutes **Phase 1**

Currently monitors are set to go into sleep mode after 20 minutes of inactivity, but the policy is for computers to be left on in full operating mode for 24 hours a day. This IT can remotely update the computers and is to avoid slow start-ups that could inconvenience faculty and cause complaints. Several institutions, however, have figured out ways to remotely "wake up" computers in sleep mode. Turning off the computers and monitors will save the most energy, but only marginally more than putting the computers "to sleep."

Assumptions

- Average of lab computers in sleep mode would be 13 hours/day
- Average of fac/staff computers in sleep mode 18 hours/day
- These averages account for winter break and holidays
- In calculating the difference between "sleep" and "off" we calculated fac/staff are on campus 233 days per year (these are pro-rated calculations from the commuter survey)
- We did not include faculty/staff laptops owned by FLC because these are already more efficient than desktops and do not have the same consistent use.

Sources

Websites: Tufts University, Cornell University, EPA/Energy Star™ website
FLC computer numbers from IT

Educate students about the importance of "sleep" functions on their personal desktop or laptop **Phase 1**

We did calculations for this strategy but decided to include it as one part of our proposed energy conservation campaign (see below). IT estimates there are 1157 of the 1330 students living on campus have computers. We believe that educating students to set-up the sleep functions on their computers and turn them off when not in use will reduce GHG emissions by 58 MTCe/year and save FLC over $5,000.

Assumptions

1157 student computers on campus
Assume 80% of these computers are laptops
Laptops go into sleep when not in use
Assume students are working on their personal computers an average of 6 hours a day

Sources

IT survey that 87% of students in campus housing have computers
Websites: Tufts University, Middlebury College, EPA/Energy Star™ website

Improve Energy Efficiency of Servers and Network Technology **Phase 1 - Study**

IT estimates that roughly 50% of its energy use comes from servers and network switches that are set up with a UPS or uninterrupted power supply system. These systems are stored in rooms and closets in Reed Library, Berndt Hall, and Miller Hall. IT uses "virtulization" software to make the most of each server's capacity and reduce the number of machines, but the demand for more computing power and energy use will only

grow over time.

In addition to the energy that the servers use, the College uses energy to keep these rooms at a constant temperature throughout the year since the servers generate a fair amount of heat. Some colleges have experimented with more efficient cooling in these rooms by looking closely at how the computer equipment is arranged inside the room and on special casing for the equipment. Short-term this merits further study. Long-term the college should consider incorporating a data center into a new building project that can take direct advantage of these systems to generate heat for the building (see Buildings).

Recently IT has switched to "thin servers" in labs where multiple work stations are run from one master lab computer. While this potentially reduces e-waste, the impact on energy use is not clear.

Purchase more efficient computers **Not applicable**

The President has committed to a policy to purchase Energy Star™ rated equipment when available. All new computers will be the most efficient computers available. However, there will not be appreciable energy savings between the new computers and the old ones when powered on or in sleep mode.

Sources

Websites: Tufts University, Cornell University, EPA/Energy Star™ website

Energy Efficient Equipment

Install vending misers on vending machines **Phase 1**

Coca-Cola maintains FLC's 74 vending machines. Their next contract is up in three years. When their contract comes up for renewal, we should insist that they including vending miser technology. These machines activate the machine when someone stands in front the equipment. Although we don't currently pay for maintenance on the machines, vending misers can reduce these costs from $45 to $86/year.

Assumptions

Vending misers will cut energy use by 50% over the course of the year.
Each vending machine uses 3740 kWh/year running 24 hours a day, 7 days a week

Sources

Middlebury Climate Action Plan
Websites: Tufts Climate Initiative

Implement Energy Star™ purchasing policy **Phase 1**

The College will see some reduction in greenhouse gases from the gradual replacement of old equipment with more energy efficient units. Beyond computers, Energy Star™ ratings exist for printers, copiers, FAX machines, televisions, DVD players, and projectors. Our washing machines are already very efficient. Energy efficient equipment is usually the same price as conventional units providing no additional cost to the institution. University of Florida estimated that most efforts to reduce "plug load" paid back in 3-5 years. Lacking a detailed inventory of equipment, we did not estimate GHG reductions.

Use more efficient fume hoods **Phase 1, 2**

Fume hoods in science buildings require a great deal of energy and typically have very quick rates of return. UC-Santa Barbara is installing fume hoods with motion sensors to turn them on only when someone is nearby.

Assumptions

Any necessary upgrades would take place as part of Phase 1 of the performance contract.

Improve the efficiency of our phone system **Phase 1 Study**

FLC has approximately 1718 phones on campus. 1085 of these are simple analog units and 633 are part of the IT network and remain "on" year-round. We need more research on energy-efficient phones and phone systems.

Sources

IT provided the number of phones.

Improve efficiency of pool pump and boiler in Aquatics Center **Phase 1 Study**

Pool systems take a large amount of energy to maintain. Evaporation accounts for 70% of energy loss in a pool. The Department of Energy recommends using a pool cover to save energy, cut the water used to make-up for evaporation, and reduce the use of chemicals. The FLC pool is 6151 square feet. At $0.60 per square foot this amounts to $3,691. Payback for the cost of a pool cover, however, is often a year or less. As a rough rule of thumb, a cover used 50% of the time will save about 50% of the heating energy, a cover used 70% of the time will result in about a 70% savings, and so on. We need more information to estimate the energy savings from a pool cover.

Reducing the pumping rate is one strategy to save energy, but the state maintains regulations for the circulation rate of swimming pools and so this might not be possible. CU-Boulder recently installed a highly efficient micro-turbine to heat and pump water for their pool. It is not clear that the College will continue to run the pool because it does not

get extensive use and is expensive to maintain.

Sources

Department of Energy Reducing Swimming Pool Energy Costs (RESPEC) program
Home Energy Magazine
CU-Boulder website

Heating, Ventilation, and Cooling Systems

Replace and calibrate thermostats **Phase 1, 2**

Assumptions

Any necessary upgrades would take place as part of the performance contract.

Re-commission buildings **Phase 1, 2**

Assumptions

Any necessary upgrades would take place as part of the performance contract.

HVAC Heat Exchanger/Recovery for air intake **Phase 1, 2**

Assumptions

Any necessary upgrades would take place as part of the performance contract.

Optimize use of EMS system **Phase 1, 2**

Assumptions

Any necessary upgrades would take place as part of the performance contract.

Replace inefficient boilers and domestic water heaters **Phase 1, 2**

Assumptions

Any necessary upgrades would take place as part of the performance contract.

Install occupancy sensors for adjustment of HVAC system when people leave the room **Phase 1, 2**

Assumptions

Any necessary upgrades would take place as part of the performance contract.

Upgrade HVAC air handlers **Phase 1, 2**

Assumptions

Any necessary upgrades would take place as part of the performance contract.

Cluster room scheduling in summer to reduce cooling loads **Phase 1 - Study**

Chuck Atwood estimates that clustering people during the summer in rooms that already need air conditioning, such as Chemistry Hall and the Center for Southwest Studies, could reduce air conditioning costs by at least 10%. What appears to be needed is a system of communication that makes scheduling certain spaces during the summer an exception.

On-Site Generation of Renewable Energy

2MW Solar Farm at the Old Fort property **Phase 1 – PPA**
Phase 4

The estimated cost for this project is $11 million. The only option in the near-term is for Power Purchase Agreement that would allow us to purchase electricity at a fixed rate and give us the option of purchasing the equipment after a 10-20 year contract. A general standard is that the equipment loses 1% of its capacity each year, meaning that after 20 years the equipment would produce 20% less power than during its first year of operation. We would not get credit for the solar power as an offset to our GHG emissions until we purchased either the equipment or the Renewable Energy Credits (RECs). In the short-term, the benefits for the College include a hedge against future increases in electricity, positive publicity, increasing LPEA's renewable portfolio, and educational value for students at the College. The more capital we could bring to the project, the quicker we could take over the system or the more RECs we could purchase at a lower cost. We would also want to try to get solar panels with a long life. San Juan Bioenergy is the latest company to express interest in this project. As a local company, they have a greater likelihood of giving the College good terms so that we could potentially capture the greenhouse gas benefit of the project sooner.

Assumptions

- Capital cost similar to comparable projects at other colleges around the country.
- Assumption that solar panels will continue to produce power for 40 years
- Purchase price after 20 years will be 35% of present value
- Power output for 2MW array is based on solar/weather data from Grand Junction,

which has a similar climate. In general, PV cells only operate at 16-17% efficiency for five hours a day.

Sources

Websites/Press Releases: Glen Butte Community College, Monmouth University, Fresno State University, Napa Valley College, CSU-Chico, CSU-San Luis Obispo, Mesa State College.

Concentrated Solar Power Plant at the Old Fort property Phase 1 - Study

Concentrated Solar Power or CSP is large utility scale generation of solar power. A large field of parabolic mirrors focuses the suns rays on pipes with a heat-conducting liquid (usually oil) that's used to generate steam which turns a large turbine. The Old Fort property has enough land to accommodate such a project, but there are several obstacles. Such projects require a large amount of water. While the Old Fort has water rights, it's not clear if enough water would be available. LPEA would also have to construct transmission lines with a greater capacity to transfer the large amount of electricity that a 20-60MW plant would generate; although smaller, the Department of Energy suggests 250kW systems are possible.

Such a project would also affect a large piece of land. The DOE estimates that a parabolic mirror system takes 5 acres of land for every megawatt of power. A 20MW project would require roughly 100 acres. DOE makes the point that relative to the power output, CSP impacts less land than large hydroprojects and the mining required to feed coal-fired power plants.

This option, however, is worth more study. FLC uses just over 11MWh a year and a 20MW project that could attract investors might leave enough electricity on the table to eliminate a large portion of our carbon footprint while also dramatically increasing the amount of renewable energy available to LPEA and the community. As technology evolves it might be possible to scale down a CSP facility to operate effectively with a smaller output at a smaller scale.

Source

L.A. Times articles "Solar thermal projects gather steam -- and opposition" – 12/3/08
Department of Energy website

Solar panels on existing buildings Not recommended

Either the price of solar panels needs to come down 50-55% or the College would need to secure grant money to cover this cost for this option to make sense for the FLC. The College has gotten grant money to install some PV panels on the new Student Union. These will serve an important educational function and could help us get better data on

their performance. At the very least, the College needs to track power production from this system to see how much to count against its carbon footprint.

Without such a discount or grant, even with a PPA that would allow the College to purchase the systems after 20 years at 35% of the original price, the payback time for any system would be 41 years and achieve only a 2% rate of return. Theoretically such an agreement wouldn't cost the College anything and it would provide benefits of positive publicity. It could also help LPEA expand its renewable portfolio. In terms of reducing the College's carbon footprint, however, it's best for the College to wait until the technology develops further or the price of energy dramatically increases.

Assumptions

- Capital cost similar to comparable projects at other colleges around the country.
- Assumption that solar panels will continue to produce power for 40 years
- Purchase price after 20 years will be 35% of present value
- Power output for potential arrays is based on solar/weather data from Grand Junction, which has a similar climate

Sources

Websites/Press Releases: Glen Butte Community College, Monmouth University, Fresno State University, Napa Valley College, CSU-Chico, CSU-San Luis Obispo, Mesa State College.

Solar hot water systems on campus **Phase 1 – Study**
Phase 2, 3

With a payback period of 27 years on a 30-year system and rate of return of 4%, solar hot water systems are on the borderline in terms of wise college investment. These numbers could get better if natural gas prices climb at a steady rate. Grants also might become available to reduce the payback time. We have the example of the Durango Recreation Center system, which provides more solid numbers for comparison than we have for some of the other strategies. A small project would provide the marketing benefit to the college and the educational value to the students without requiring large amounts of capital. The College has secured a grant to help offset the cost for a solar hot water system in the new Student Union. This will provide useful information for potentially setting up additional projects for the Student Life Center or the residence halls. We recommend these projects for phase 2 and 3 simply because of the limited staff time to pursue all the initiatives in Phase 1.

Assumptions

- The size of the pool indicates that a SHW system for the Student Life Center and pool would be 2/3 the size of the system being installed at the Rec Center.

- Resident Halls use 25.2% of our natural gas consumption – 17,691 MMBtus
- Of this amount 15% is used for heating water for showers
- Once low-flow showerheads are installed in Cooper Hall it will account for 8.25% of the hot water bill for the residence halls (based on occupancy and shower use calculations)

Sources

Cathy Metz – City of Durango provided figures on the Durango Recreation Center
Climate Action Plans: Duke University, Middlebury College
Websites: NAU, UNC-Chapel Hill

Small wind system for the Old Fort property **Phase 2 - Study**

During the winter and spring of 2008, the Environmental Center facilitated data collection on wind speeds on the mesa above the parade grounds at the Old Fort property. We collected five months of data that showed an average wind speed of 8-9 mph. Based on this information a small wind turbine (Bergey S60) could supply power to the research station. This unit costs $30,000 and we have assumed $10,000 for installation. The research station currently uses 6266kWh/year at a cost of $2,946. This use puts 4 MTCe annually into the air. Such a system could serve as an effective educational demonstration and would count against the school's carbon footprint if the College gets the master lease to the property

Assumptions:

Five-months of data is a representative sample for the average wind speed throughout the entire year. This is similar to wind speeds in Telluride.
It's possible to install a tower in the rocky soil at the Old Fort.

Microwind turbines on existing buildings **Not recommended**

The technology for these turbines is rapidly developing with a number of very different models on the market that can generate energy at wind speed as low as 2 mph. Unfortunately all the models are extremely expensive. The most inexpensive models we could find were $16,000. Power generation for these units is often only 2,000 to 5,000 kWh per year.

Currently a few colleges and universities are experimenting with these turbines on a trial basis as a testing ground for manufacturers.

Sources:

Manufacturer websites
Renewable energy websites

Arizona State University School of Sustainability

Microhydro system using FLC's wastewater **Phase 2 – Study**

We looked at the potential to generate electricity using the wastewater that we pump down the hill to the waste water treatment system. The calculations to determine the potential power generated by such a system are straightforward.

(Head x Flow) / 10 = Watts

Flow – 61 gallons/minute – estimates an average flow of 32 million gallons over the year
Head – 500 feet

Watts/ 1000 = kWh x 8790 = kWh/year = 26,810 kWh/year. This would remove 18 tons of MCTe from the air and save $1,836/year

What we did not find was the cost of the turbine and installation in order to finish the calculations on such a system but we believe that the payback would be greater than 30 years and could require ongoing maintenance.

Sources

City Wastewater Treatment Plant
FLC Sustainability Assessment

Ground Source Heating and Cooling system **Phase 1 – Study**
Phase 2, 3, 4 - Option

A stand alone ground source heating and cooling system typically has a 15-year payback, but if you consider just the additional cost of building this type of system into the design of a new building, the payback drops to five years. FLC is planning to put in several new residence halls on the southeast side of campus, providing an opportunity for a well system to complement these high-efficiency buildings.

Initial study through the geology department or by looking at comparable projects in the area is recommended before moving forward with a detailed feasibility study, which could cost up to $60,000. Local or regional projects to study include:

- The Smiley Building has installed a vertical ground source heat pump system
- Three Springs Inc. considered a system but didn't move forward.
- Mesa State in Grand Junction is moving forward with an installation.

If initial investigations hold promise, we recommend a more detailed study. While expensive, the study could payback several times over. The study would reveal the cost and potential energy savings given our specific geology on the mesa and recommend either a vertical or horizontal well system that uses either air or water in the earth to regulate temperatures.

If cost-effective to pursue, the College could integrate a ground source system into Elbert and Fremont Halls scheduled for completion in 5-6 years. The evaluation of this option should take place before the design phases for these buildings so it's possible to integrate it into the design of these buildings. There might be potential to integrate such a system into existing building as well, further reducing our energy load. Replacing the grass in the stadium field with artificial turf has come under discussion. This would provide an opportunity to install a well field and pipe system to the nearby buildings.

Assumptions

- Conventional high-efficiency system would cost $5.65/square foot of building space
- Cost of ground source system is $7/square foot of building space; 24% premium
- Ground source system would reduce energy costs by 29%
- Ground source system would last for 30 years
- Energy targets for Animas Hall are appropriate for other resident halls

Sources

John Sommers, Henderson Engineering
Websites: Bowdoin, Juanita College, Oregon Institute of Technology

Biomass gasification heating system **Phase 1 – Study**
Phase 3 - Option

The most cost effective method for FLC take advantage of biomass would be a gasification system so that we wouldn't have to switch boilers for burning wood chips directly. Only a handful of campuses are using a biomass gasification system: Mt. Wachusett Community College in Massachusetts, Middlebury College in Vermont, UC-Davis, and University of Minnesota-Morris, another COPLAC institution[10]. The new San Juan Bioenergy Plant in Dove Creek will have a gasification system for sunflower seed husks. Differences in size, campus heating systems, feedstock availability and cost, however, make it difficult to get an estimate to apply to FLC. UM-Morris is perhaps the best comparison. Like FLC they have a campus of 1 million square feet of building space. Their system was connected with the construction of a research facility that drove up costs. They also use mostly agricultural residue for their feedstock. We would likely use a mix of agricultural residue and wood chips. Finally, the project manager said that converting biomass into gas that works in an old boiler system such as ours requires a higher level of technology that is just now coming into the marketplace. Additional issues related to gasification include: consistent delivery and storage of feedstock, disposal of ash produced by the process, and ensuring that CO2 released during combustion is minimized or offset by additional tree planting. Using the information we have at hand, the numbers suggest that biomass gasification at least merits additional study. Stacy Simons, a representative from the Governor's Energy Office, has offered to visit Fort Lewis and provide a quick assessment of the potential to use biomass heating

[10] Within our region, NAU is constructing a 15.9 MW, $37 million biomass generator to produce electricity.

on campus given the distribution of our buildings and our current equipment.

Assumptions

- Initial cost of a system to cover FLC's heating load would be $6 million
- FLC would average 19/tons a day of feedstock
- Feedstock would cost $35/ton
- Combustion of biomass would release no CO2 or have this CO2 offset

Sources

- Middlebury Climate Action Plan – 2003, 2007
- Websites – Mt. Wachusett Community College, Northern Arizona University
- Press Releases and Fact Sheet – UC-Davis and UM-Morris

Hydrogen Fuel Cell **Phase 1 – Study**

There are a handful of colleges and universities that are installing fuel cells to power portions of their campuses. Most of the campuses we found are in California where the state government has begun to emphasize this technology. Most fuel cells still require fossil fuels in order to produce hydrogen, though some technologies are looking to get hydrogen from biomass. We need to study the potential of this technology in more detail.

Sources:

DOE website on hydrogen
Press release: CSU Northridge
Sustainable Stanford

Landfill-Gas-to-Energy project **Not applicable**

The University of New Hampshire has partnered with their local landfill to build a 12.7-mile pipeline to transport landfill gas (methane) to the University's co-generation plant. The cost of the project is $45 million dollars and will supply 80-85% of the university's energy needs. The costs for this project were actually reduced because the University already had a co-generation plant and the landfill already had a methane well system. The primary costs were the pipeline. Our situation is different. The local landfill at Bondad is further away. Bill Rose, the general manager at Transit Waste, says that there tests indicate Bondad generates very little methane, primarily due to the low humidity. This is common to landfills in arid environments and is a good thing since methane is an extremely powerful greenhouse gas.

Anaerobic methane digester **Phase 2- Study**

Morrisville State College in New York has a methane digester that generated 335,000

kWh of electricity from the manure of 400 milking cows. This amounts to 231 MTCe and a savings of almost $23,000 in electricity costs. Because this would be at the Old Fort, the College would need to sell the electricity to LPEA, which would make the return smaller than just taking it off our electric bill. Even so, if we were to calculate savings based on our electric bill the rate of return would be over 50 years. The total cost of the Morrisville digester was almost $1.2 million dollars. The article on Morrisville also does not address the annual costs of maintenance.

The dairy complex at Morrisville consists of a free stall milking barn, two heifer barns, a dry cow and heifer barn, calf greenhouse, and dairy showroom. They use up to 10,000 gallons a day of manure. The Old Fort has 300 mother cows plus their 280 calves plus 50 replacement females and 14 bulls. The animals are not penned up very often and so it would be difficult to collect the manure. As operations evolve out at the Old Fort this could be something to consider, even on a small scale. This year an Engineers Without Borders project is using manure for small methane digester used for cooking. Using methane digesters to heat the station might be very practical but requires more research.

Source

"Anaerobic Digestion at Morrisville State College: A Case Study" by Dr. Walid H. Shayya.

Human Behavior

Campus-wide energy conservation campaign **Phase 1**

This campaign can start during the fall of 2010 as the new electrical metering system will be ready by then. Programs that could be a part of such a campaign include departmental energy audits, resident hall competitions, award programs, computer efficiency education, shorter shower campaign, holiday power downs, along with signs and posters. Almost all of this reduction would come through electricity use. Individuals have no control over thermostats and the only way for individuals to affect energy used for heating is through shorter showers and by keeping windows and doors closed. We believe a two and a half percent reduction in electricity use, or 278,415 kWh, is within reach.

If people became more tolerant of colder or warmer temperatures, we might be able to expand the temperature range (68-74 degrees) for the existing system. This range, with a target temperature of 72-74 degrees once the systems are fully operational, is calibrated to the complaints that PPS has received over the years. Some estimate that for every degree lower on the thermostat you can reduce energy use by 1%. Using this estimate for FLC, going to 67 degrees would translate into a savings of 702 MMBtus/year (equivalent of 56,589 kWh), $5693, and 39 MTCe.

Here are some calculations of savings for FLC based on other schools success with some of the initiatives above:

- Computer efficiency education: save 84,640 kWh/year
- Holiday power down: 28,998 kWh/year
- Resident hall competitions: 17,437 kWh/year
- Shorter showers: 163 MMBtus/year (equivalent of 12,521 kWh) for each minute cut from a shower

Assumptions

Computer efficiency education (see above)

Holiday power down
- Based on 3% savings off of December electricity bill
- UNH achieves a 10-13% reduction in electricity use with their power down, but Student Housing already unplugs student equipment during breaks and so the electricity savings would come solely from offices. We assume this is 30% of the total of electricity load.
- Four weeks of power down per year (Thanksgiving, Winter break, Spring break)

Resident Hall Competitions
- West Hall electricity consumption is equal to Cooper (there was no data for West)
- 2 month-long competitions/year
- 85% of resident hall electricity consumption happens during school year
- Achieve a 5% reduction in electricity across all resident halls during the competitions

Shorter Showers
- 500.4 BTUs to heat a gallon of water for a shower
- Assumes all showers will have low-flow showerheads by the time of the campaign

Sources

Websites: University of New Hampshire, Yale, UC-Berkeley, Tulane University, Middlebury College, and University of Florida

Charge departments for their energy use **Phase 1 - Study**

Stanford University has an “Energy Conservation Incentive Program” that sets a departmental utility budget based on past consumption and lets participants "cash in" unused kilowatt-hours; those that exceed their electricity budgets pay the difference out of their own funds.

“By the end of the program’s third full year, participants collectively used 3 percent less electricity than budgeted—netting a total rebate of $830,000. The program aims to reduce electricity use by 5 percent from a 2003 baseline. A number of schools and administrative units have achieved this goal, but others have had their baselines adjusted upward to accommodate additional electricity use from new buildings and expansions of research-

driven activity."

This program would require effective meters to measure energy use across campus.

Assumptions

Departments could understand this as an opportunity to gain money for their department
It is possible to execute this program with most departments sharing buildings
It is possible to account for different building efficiencies across campus

Sources

Sustainable Stanford website

Buildings

Install low-flow showerheads **Phase 1**

Installing low-flow showerheads saves money for heating costs and water use. Using the last inventory of fixtures there are 185 showerheads on campus that use an average of 4.25 gallons per minute. The low-flow standard is 1.5 gpm. These figures do not account for shower use in the summer, meaning that savings and GHG reductions are likely greater than what we list in the spreadsheet.

Assumptions

Last fixture inventory is accurate

Increased efficiency with new resident halls **Phase 1, 2, 3**

The building of new residence halls gives the College an opportunity to reduce its carbon footprint. New academic buildings often require more energy even though they are more efficient. New residence halls, however, will likely have the same energy loads and so comparisons between old and new buildings will show greenhouse gas reductions. The scenarios listed in the spreadsheet show what is currently planned for residential housing.

Assumptions

- Camp, Crofton, Escalante, and Mears will either be demolished or be taken over by other departments that will reduce loads someplace else on campus.
- Savings projected for Animas Hall are roughly equivalent to savings on future residence hall projects

Design data center into new building to capture heat from computer servers **Phase 1 - Study**

Our computer servers are distributed in odd spaces across three buildings. These servers generate large amounts of heat and the college must maintain these spaces at 75 degrees throughout the year. A centralized data center would require 500 square feet (Matt McGlammery). A thoughtful design should allow a data center to cut heating costs. A good design could also find the most efficient ways to cool such a room and reduce electricity use. The sooner we can reduce the cooling loads the better. We should have enough data to calculate the estimated heat output of the servers.

Window replacement **Phase 3**

Energy-efficient windows can save 10 to 25% off of heating and cooling costs but are expensive and typically have paybacks of greater than 20 years or more. The impact of replacing windows also depends on a number of factors such as orientation, materials, glass, glazing, frame materials, and the surrounding building envelope. Without meters on specific buildings it is difficult to evaluate the potential savings and compare against the costs. Window replacement would be most appropriate during phase three after we have metered buildings and finished the rest of the performance contracting. Buildings with especially poor windows would likely fall within phase 2 of the performance contracting process.

Sources

Energy Star website
Consumer Reports website - http://www.consumerreports.org/cro/home-garden/home-improvement/hardware-building-supplies/windows/windows-10-07/overview/wind-ov.htm

Add solar film to windows **Phase 1 Study**

The University of Florida proposed using solar film on the windows of certain building to reduce heat gain and cut cooling costs. Using solar film on the Engineering Building would cost $11,200 (41,000 sq. feet of windows to cover). They projected savings of $4,500/year and a cut in greenhouse gas emissions of 46 tons a year and a saving $91,000 over the lifetime of the project. Stanford cut cooling costs by 50% with the installation of solar film on 6,200 square foot Encina Hall. It's not clear if we have buildings with air conditioning that could benefit from solar film. This requires further study.

Sources

University of Florida Sustainability Plan
Website - http://asumag.com/mag/university_film/

Building improvements not covered by performance contracting **Phase 3, 4**

Stanford has a notable Energy Retrofit program in which staff members apply to get funding. Money for the program comes from energy savings.

Assumptions

There will be some worthwhile projects that are done pursued as part of the performance contract.

Sources

Sustainable Stanford website

Transportation

Transportation Demand Management Strategies – Phase 1

Coordination of a Transportation Demand Management Program **Phase 1 and 2**

Academic research and our discussions with other schools suggests that the most effective measures for reducing vehicle trips to and from campus are subsidized public transit, flexible work scheduling, and financial incentives, either through parking rate structures or rewards for commuter behavior. One report suggested that these primary strategies can result in a 10-25% reduction in vehicle trips. A second research paper suggested that the reduction could be on the order of 30-50%. Historical data from universities with TDM programs show reductions between 11% and 33% in SOV-trips.

A second tier of strategies, such as ridematching, preferential parking for carpools, emergency ride home service, and bicycle promotion can provide an additional reduction of 3-10%. Research suggests these second tier strategies have value in establishing and reinforcing alternative transportation as a norm on a campus. Many campuses are looking at bike and pedestrian programs as some of their most cost effective measures for reducing parking demand. Because of the longer distances that staff and faculty travel to campus, carpooling, vanpooling strategies should target this group, while cycling and walking strategies should target students.

Lessons that we have gathered to create an effective TDM program are:

- Stay flexible by offering several different services that allow individuals to build their own commuting routine. Give participants the opportunity to try out alternatives without losing any benefits of their established pattern.

- Institutional support for alternative transportation and TDM programs is important to their success. Make sure messages are consistent from the institution. For example, additional parking structures require people to use them to pay of the debt, which works against the goals of a TDM program.

- Think out the long-term implications of the institutional funding model for TDM programs. Relying solely on parking revenue can mean a successful program defunds itself over time. Explore grant programs, seek state and federal support for getting cars off the road, and partner with local transit agencies, other institutions, and city and county initiatives whenever possible.

- Start a “commute club” program to encourage and reinforce group norms around alternative transportation and to increase the visibility alternative transportation choices.

- To have the most impact per dollar spent, tracking and analyzing commuter data is essential. UC-Santa Cruz was the most impressive school we encountered. Like FLC they are located on a hill and have only two entrances onto campus. They use their entrance gates to record all mobile traffic, including bikes, pedestrians, and delivery trucks, that enter campus over set periods of time. They can also record number of passengers in carpools to get an accurate average vehicle ridership. Because of its geography, Fort Lewis should consider experimenting with these types of tallies.

Our proposal would require staffing, at least in phase 2 of the proposed program. Staffing is necessary to coordinate marketing, track data, and be a contact person for the various programs, such as van or carpool programs. We discovered, however, different staffing models in the course of our research. Cal-Poly San Luis Obispo has one full-time coordinator. She said that someone in her classification would typically receive $17-$29/hour, depending on experience.

Alternatively, Evergreen State College hired a student to run the program in 2003. They report that the students have been so dedicated that they've done a really good job and have been especially effective at coming up with marketing strategies for fellow students. During school the student coordinator works up to 19 hours a week. The two most successful people received academic credit and were able to work about 30 hours a week. They developed software specifically for the position so they can work at home. A staff member in police and parking services provides minimal oversight. Evergreen pays the student coordinator $9.00/hr out of the parking revenue and then have been able to get state grants, along with money from their student green fee for several projects. Beyond the student's salary the total budget for their TDM program is $5000, though they are working closely with their sustainability office to expand their program.

We have estimated the total capital cost in phase 1 of a TDM program to be $30,000 and the total annual cost of operation at just over $21,000. Phase 2 we budget a capital cost of $70,000 and an additional operating cost of $17,250 for expanded programming. We believe that grant money might be available to assist with the capital costs.

Sources:

Personal communication: Transit coordinators at University of Washington, UBC, Evergreen State, Western Washington University, UC-Davis, UC-Santa Cruz, Cal Poly-San Luis Obispo, Stanford, CU-Boulder, Boise State, University of Nevada-Reno, UCSB.

Websites: University of Washington, UBC, University of Victoria, Evergreen State, Western Washington University, UC-Davis, UC-Santa Cruz, Cal Poly-San Luis Obispo, Stanford, CU-Boulder, UNC-Asheville, Kennesaw State University, Grand Valley State University, University of Montana, Cornell University, Dartmouth College, UVM.

Climate Action Plans: UC-Berkeley, Duke, Middlebury, University of Florida, University of Buffalo, UCSB, Tufts

Research Reports:
- "Employer Outreach TERM Measurement Process" – Presentation by Commuter Connections, January 15, 2008.
- Littman, Todd. *Win-Win Emission Reduction Strategies*. Victoria Transportation Policy Institute, July 2008

Outreach campaign to reduce single-occupancy vehicle trips and promote alternative transportation **Phase 1**

While the promoting a TDM program is essential, once established it does not have to be expensive for the college. The University of Washington spends only 2% of their budget on marketing Much the marketing cost could be shared with regional transit agencies. It is not worth trying to identify the GHG reductions from an effective marketing program and so we've included this as an ongoing element of the TDM campaign.

Lessons from other schools in promoting alternative transportation include:
- Using social marketing techniques such as testimonials and commuter profiles to establish alternative transportation as the campus norm. We have collected several examples of promotional material used by campus' with good TDM programs.

- Work through social networks by identifying "champions" that can promote alternative transportation to the friends and colleagues. With their "One Bus Away" program, the University of Washington has used older students to lead tours for incoming students of the local attractions using public transit. Similarly, UC-Santa Cruz has had success with incoming students by educating parents about alternative transportation options, such as carsharing, during their welcome week. Parents are pleased to find out that incoming students don't need a car and then reinforce this message with their children.

- Present comprehensive information. Written material that is comprehensive about alternative transportation options, including multi-modal maps, has had success at Stanford.

- Maintaining regular and fluid communication with the campus community about alternative transportation. For students this means using electronic media tools such Facebook, messaging, and websites to communicate about transportation options.

We have budgeted $2,000 for outreach and marketing alternative transportation strategies. Marketing of specific projects and campaigns could be folded into the funding proposals for those projects.
Sources:

Personal contact with TDM coordinators at Stanford, University of Washington, UC-Santa Cruz, and Cal Poly-San Luis Obispo.

Cars and parking

Parking management strategies — Phase 1

There are numerous approaches to providing effective parking for FLC commuters and residents. The FLC Parking Committee is in the best position to decide on parking strategies. We simply encourage linking parking fee increases with provision of alternative transit options. This will make price increases easier to market and will help fund alternative transit programs. Considering parking and transportation programs together is central to running an effective transportation demand management program.

UCSB uses some innovative approaches to parking. They have personal parking meters available that go on the dashboard of a car. The driver turns it on when they park their car and turn it off when they pull out of the stall. This allows car owners to pay for parking by the minute anywhere on campus. Drivers can take the meter to the parking office to pay for adding time to the device. Students living within two miles of campus also can only purchase daily parking permits, which provide a strong incentive for these students to find alternatives to driving to school.

Sources:

UCSB website and personal communication with transit coordinator

Provide incentives to encourage carpooling — Phase 1

The two primary incentives that institutions use to promote carpooling are preferential parking and discounted parking fees. More developed programs offer both incentives and facilitate ride matching through the transit office. When run through a commute club, individuals receive a set of free or discounted daily parking passes for days when they must drive alone, access to the emergency ride home service, and sometimes prizes or bonuses for participation in the program. Cornell offers different levels of financial discounts according to the number of people in the carpool. Many campuses open up preferential carpool parking to other users after 10 a.m.

We assume that regular carpoolers would be required to commute together three days a week and that without the program there would be two additional SOV trips on the road. Twenty registered carpools (10 faculty and staff and 10 students) would result in an emissions savings of 31.2 MTCe. Cost for this program would come in the form of decreased parking revenue ($3600 calculated from $90/year for 40 people) and the cost of promotion and any other incentives included for the program. We estimate a total yearly cost of $4000.

The commuter survey suggests that FLC already has a high rate of carpooling.

Preferential parking might simply reinforce existing carpooling rather than getting additional carpools on the road. Our hope is to increase the number of carpool rides by 2.4% over ten years. The cost these emission reductions would increase with increased parking fees.

Assumptions:

- On average, changing one SOV trip per week to a carpool trip would save 0.17 MTCe for faculty and staff and 0.09 for students. This is based on the FLC Commuter Survey.
- $400 is enough to promote the program

Sources:

Personal communication: transit coordinators University of Washington, UC-Santa Cruz, Cal Poly San Luis Obispo, Evergreen State College, UCSB
Duke Climate Action Plan

Provide incentives to encourage use of low-emitting vehicles Phase 1

FLC has decided to offer a discount for cars on the low-emitting vehicle list associated with the LEED building program. A similar idea exists in UC-Berkeley's Climate Plan recommended assigning a "carbon fee" to the parking permit. As the last discussion of this idea involved not raising rates rather than providing a discount from the current price there would be no cost associated with this initiative.

Provide emergency rides home for commuters not using cars Phase 1

This is a re-imbursement service for a taxi or other ride home that will put a transit commuter at ease in case of a family emergency or sick child. There are many ways to structure such a program. University of Washington provides 90% reimbursement of up to 50 miles a quarter. Their transit coordinator reports that a couple of people use the service every week. UNC-Asheville allows three per semester. Boise State caps this service at six rides or $300. Almost all institutions require that someone be enrolled in their commuter club in order to use the service. Assuming this service is used once per week and the average distance to home is 15 miles. The cost of this program to the college would be about $780 for the year.
Sources:

Personal communication with Celeste Gilman, UW transit coordinator
Websites: Boise State, UNC-Asheville, University of Washington

Public transit

Expand transit pass program to FLC staff Phase 1

For several years, ASFLC has allocated a portion of student fees to provide Durango T passes to all students. Starting January 1, 2009, the Durango T decided to extend free service to FLC faculty as part of their effort to promote transit to teachers in 9-R school district. Although the staff was not included in this benefit, having free, or in the case of students, heavily discounted, transit services for most of FLC is impressive, given the size of the college and the transit system. At many institutions, having free or discounted passes to students, staff, and faculty has had a large impact on drive alone vehicle trips. At CU-Boulder, for example, ridership has increased 600%. Large schools such as the University of Washington and UBC identify their bus pass program as the service having the greatest impact on SOV travel. In 2008, the Durango T went to a fixed annual schedule and 30 minute headways. This increased ridership by FLC students by almost 50%.

Several years ago, free service for staff and faculty cost the college $800. Transit services, however, have developed a great deal since this time making it difficult to gauge a current cost. ASFLC's contract with the Durango T has a cost per person of roughly $18 based on 2008-09 rates Cal Poly-San Luis Obispo's contract with their transit provider, which also runs buses on 30-minute headways, costs them roughly $14.50/person. UCSB costs just over $13/student. Using the higher figure, extending free passes to the 346 staff members would cost $6,228. An average switch for staff of one ride per week from driving alone to riding transit would reduce our emissions by 98 MTCe.
Sources:

FLC Commuter Survey
Personal communication: University of Washington, UBC, UCSB, and CSU-SLO transit coordinators, Brad Hitti

Provide incentives for using the Durango T **Phase 1**

In order to provide incentives for riding transit, the school could provide recognition, prizes, and discounts to Durango T riders. Providing this kind of public recognition for transit riders could help establish transit use as the norm for members of the College. This is included in the Commute Club benefits in the spreadsheet. We also need better tracking for transit use. Astonishingly, only 10% of students get their free bus pass stickers, while 17% students reported using the bus to get to and from campus at least once a week.

Bicycle and pedestrian programs

Provide a bike registration program **Phase 1**

This is a common service on campus to prevent bike theft. We believe that this would be of minimal cost to the college.

Provide access to showers and lockers for bike commuters **Phase 1**

Providing showers and lockers for bike commuters to change after biking up our hill is common at universities and we feel is a basic recognition the College can provide to validate cycling. Costs for access to showers and lockers at either Whalen Gymnasium or the Student Life Center should be nominal. Some institutions rent lockers to bicycle commuters at reduced rates.

Sources:

Websites: University of Washington, UBC,

Cycling incentive program **Phase 1, 2**

Providing small incentives to cyclists could be part of the commute club. Incentives could include discounts at area bike shops, free lights or locks, and contests, such as University of Washington's ride in the rain program that included 860 participants and 80 teams. At University of Vermont, commute club participants commit to walk or bike three times a week for two four-week blocks. They record their trips on a card that they can turn in for gift certificates as local businesses. The cost of this initiative is part of the Commute Club benefits in the spreadsheet.

Sources:

Websites: University of Washington, UVM, UVic

Expand Outdoor Pursuits bicycle check-out program **Phase 1**

Currently Outdoor Pursuits has 13 mountain bikes that members can check out for up to a week. With very little publicity, the program already is oversubscribed and Tom Whalen believes that the program could add 30 additional bikes and still operate at capacity. We feel increasing the visibility of this popular program would have educational benefits beyond the immediate GHG reductions.

Bicycle loan programs are popular at a number of schools. University of Montana had one of the first programs and allows check-out of cruiser bikes for two days with a college ID. CU-Boulder and TCU have fleets of 50-60 cruiser bikes. TCU allows check-out for a semester.

The primary constraint is the lack of space in OP for additional bicycles. We recommended purchasing bicycle lockers for 20 additional bicycles that can be located behind the Student Life Center and which would be accessible to the OP staff. In the future, if additional space is available for a dedicated bicycle facility, FLC could rent these lockers to FLC riders (based on other campuses, rental rates for lockers would fall

between $20 and $60/year.) Lockers cost approximately $600 each for a total cost of $12,000.

For ease of maintenance and management, we believe purchasing of the same bicycles will lead to a more successful program and a longer life for the bicycles. We estimate 20 bikes and accessories would cost FLC $8,000, bringing the total for this initiative to $20,000. This could be subsidized by parking revenue or be paid for by through grants. Assuming that the 20 additional bikes would get constant use, we estimate on any one day five of the students using the bikes would be commuting to school. This would remove 1050 vehicles trips to campus during the year and remove 5.5 MTCe from our footprint.

Sources:

Personal communication – Tom Whalen, Outdoor Pursuits, Peter Roper, Transportation Programs Manager, CU-Boulder, TCU bike coordinator
Websites: UMT, CU-Boulder, TCU

Facilitate self-maintenance of bicycles **Phase 1**

Outdoor Pursuits already provides access to their bike stands and tools for members to repair their bikes, but they do not provide tune-up services. Making more of the community aware of these services should be the focus in Phase 1. Identifying a dedicated space for bike storage and maintenance on campus would provide OP with more space for their other program needs and likely increase the number of people using this service. We were not able to identify GHG reductions for this specific strategy.

Sources:

Websites: UC-Santa Cruz, Stanford.
Personal communication: Tom Whalen, Outdoor Pursuits

Bike clinics and workshops **Phase 1, 2**

OP provides occasional clinics on bike maintenance. In Phase 1 we concentrate on promoting these clinics. UC-Santa Cruz, for example, holds a drop-in maintenance clinic every Thursday during the school year from 2:00 to 5:00 p.m. UBC charges $15/hour for instruction on fixing bikes.

Phase two would include an expansion of these services. Several campuses have dedicated "bike shops" including Evergreen State, CU-Boulder, UC-Davis, and UBC. The University of British Columbia's bike kitchen has a wide range of new and used parts, as well as new and used bikes for sale. For $7.50/hr, all campus cyclists can use the Bike Kitchen tools and facilities to repair their own bikes. There also might be opportunities to partner with the newly forming Bicycle Cooperative in Durango to offer these benefits to the campus and generate volunteers from campus to help run the

cooperative.

Phase two would also include bike clinics focused on riding and trip strategies. Topics could include: rules of the road, riding in the winter, bike touring and mountain biking 101. Volunteer leaders could receive additional benefits from the bike portion of the commuter club program. We were not able to identify GHG reductions for this specific strategy and feel the cost would be nominal.

Sources:

Websites: UC-Santa Cruz, CU-Boulder, Evergreen State, UC-Davis, UBC

Provide incentive to encourage walking to school **Phase 1**

Pedestrian programs can include provision of trail maps, contests, and provision of walking gear, such as carts, pedometers, and even collections of mp3s for walker iPods. University of Washington's "Walk-In Challenge" resulted in 16,000 walks of 10 minutes or more, with 440 participants. The University of British Columbia loans out Can Carts, a lightweight, high-capacity, watertight cart that can attach to one's bike but is designed to serve as a handcart when unhitched. Check-outs are for three days. The cart is convenient for trips to the grocery, laundry, library, and for faculty and staff transporting presentation material. Because of a lack of data we did not attempt to breakout the GHG impact of a pedestrian program or campaign and costs are part of the Commute Club incentives in the spreadsheet.

Sources:

Websites: University of Washington, Cornell University, Kennesaw State University, University of British Columbia.

Transportation Demand Management Strategies – Phase 2

Cars and parking

Create an FLC vanpool park-and-ride system from outlying locations **Phase 2**

Based on experiences at other schools we believe that a small vanpool program holds real potential for Fort Lewis College. Within vanpool programs, individuals volunteer to be drivers and agree to arrive at a central pick-up point at a designated time. Drivers get a mileage allotment for personal use of the van and typically get a free fare. Back-up drivers receive a discount as well.

Vanpool programs vary by institution. We looked in detail at the UC-Santa Cruz and Cal Poly-San Luis Obispo vanpool programs because of their similar geography. UCSC has

22 vanpools organized. Fares range from $31 to $70/month depending on the distance from campus. The university covers 60% of the program costs, with user fees covering the rest. They received an air quality grant that allowed them to purchase their initial vans. Operating costs are $13,200/van/year. UC-Santa Cruz says that vanpools are especially useful to employees who receive less pay and are forced to live further away because of housing costs. Currently they have a waiting list of 40 to 50 people for their 240 spots. Cal Poly-SLO has ten vanpools and charges $100/month for their service.

University of Washington, Boise State, UC-Davis, and Cornell are all arranging vanpools through a private provider or a county agency. At UC-Davis, the transit coordinator is the liaison between the individual driver and the rental company. They help set up the vanpool, provide some light oversight, and pay a flat subsidy of $65 to reduce the cost for employees. Typical fares at Davis are $35-$90/month plus fuel. They say this has lowered their costs and relieved them of the insurance and maintenance problems with the van. They also say that it's easier to get a vanpool going because they don't have to purchase another van every time a group wants to start a vanpool. They simply call and help set up the lease with the rental company.

The coordinator at UCSB said that while running their own program does add an administrative burden, riders like it better. Forcing an individual to deal directly with a rental company puts the liability and administrative work on the individual and that this scares people away from the service. UCSB pointed out that UC-Davis does not have a large vanpool program. They said that vanpools are really for individuals coming from thirty or more miles away. Using the AAA cost calculator for vanpools can help with marketing because it shows the savings the service provides to individuals.

A third model is for the College to lease the vans from a company such as Enterprise or VPSI. This is the program at UC-San Diego. This is usually about twice the cost of running the program internally. UC-San Diego, however, receives a subsidy from the county that makes this affordable.

To determine costs and impacts for a vanpool program, we took the UC-Davis model of a $65 per rider subsidy. With a vanpool population of 50 people would cost $3250. The college would also lose $4500 from not having these people purchasing parking permits. If these riders rode twice a week, it would eliminate 100 SOV trips every seven days or about 13 MTCe each year. Using the UC-Santa Cruz model of running our own vanpool, the cost for running five vans would be almost $40,000/year. This does not include the cost of the vans themselves. Given these large start-up costs we believe the UC-Davis model is currently the best model for FLC. We also feel it would be valuable to collect data on where members of the FLC community live and then use GIS mapping to understand where a vanpool would be most successful.

Assumptions:

- Cost of the Santa Cruz model is $13,200*5*60% = $39,600.

Sources:

Personal communication: Transit coordinators at UC-Santa Cruz, Cal Poly-SLO, UC-Davis, University of Washington, UCSB
Websites: University of Washington, UC-Santa Cruz, UCSB, Stanford, UC-Davis

Create a more effective rideshare program **Phase 2**

For the purposes of planning, we define rideshare as providing an informal, one-time match between drivers and passengers traveling to the same destination. This could be travel up to campus or travel to Denver. Rideshare differs from carpooling in that the lack of registration with parking services. There are a number of ways universities have tried to facilitate these types of arrangements. Fort Lewis recently set up a basic system through its website. Region 9 also provides an online ridematching service

The University of Washington calls rideshares to campus "occasional carpools" and provides discounted and preferential parking by having an attendant take money from the riders ID account in lieu of a parking permit. They discourage, but do not enforce, picking up riders within a ½ mile of campus in order to get the discount.

Middlebury suggested creating an automated system that would track the number of rides offered by each student. If over four rides a year, the student would get their parking fee refunded. They estimate $2,000 to set it up and $1,000 to maintain. They said 25% of students usually offered at least four trips. They estimated this would reduce GHG from transportation by 100 MTCe and have a cost/offset ratio of -$12.

UBC has organized a "Rideclub" with ID placards for the dashboard of potential drivers and ID cards for riders. This is primarily to encourage safety for hitchhikers. Finally, online ridematching services are evolving and several campuses are exploring ridematch programs through facebook. UCSC says that basic program costs for Zimride, one such service through facebook is $4500.

We anticipate these systems will continue to evolve and have packaged a more developed ridematching service as part of Phase 2. Greater visibility for the current services should be a first step. During phase two we penciled in $4500 as an estimated cost for an effective system.

Personal communication: transit coordinators UCSC, Evergreen State, University of Washington, UC-Davis
Websites: UMT, UBC, Cornell
Documents: Middlebury 2003 Climate Action Plan

Begin a carsharing program **Phase 2**

Members of a carshare service pay a fixed annual rate and then a per hour charge to use a fleet of passenger vehicles managed by a private company. Typical rates at universities are $35/year and $8/hour. Carsharing is more developed in Europe than in North

America where there is a more compact development pattern. Many colleges and universities have just started carsharing programs and still evaluating their efficacy. Some institutions subsidize carsharing as a means of providing vehicle access to departments. UBC has the "car-owning" department pay less than the "car-borrowing" department. Other institutions provide the option for individuals, often as an added benefit for members of their commuting club or program. UC-Santa Cruz has prevented first and second year students from bringing cars to campus and instead subsidizes student membership in Zipcar, the primary carsharing company in North America. They gave rave reviews, but see this more as a parking reduction strategy rather than a strategy to reduce emissions. Their hope is that older students stick with the students and choose not to get a personal vehicle.

Research suggests that carsharing reduces SOV travel and increases transit use when the owner gives up his or her personal vehicle. When participants don't have a vehicle, however, carsharing can actually increase vehicle use and emissions by providing new access to vehicle transportation. We believe carsharing could be an appropriate strategy for the second phase of a TDM program and deserves study for ways to properly structure incentives to actually reduce vehicle use. We estimate a cost of $2,000 to provide a small subsidy for the program.

Sources:

Personal communication: transit coordinators at UC-Santa Cruz, Stanford, UNM, University of Washington.
Websites: University of Victoria, UBC, UC-Davis, CU-Boulder, UNC-Asheville

Public transit

Support aerial tramway project **Phase 1 – study**
Phase 2

The oft-mentioned aerial tramway to Fort Lewis from downtown Durango is a real possibility. The base technical cost for running a tramway from Buckley Park to campus is $5 million dollars. Alternative starting locations in downtown such as the Discovery Museum or the new library would be more expensive but might prove more convenient since there is more space for parking and closer connections to the Animas River Trail. Such a system would be integrated into the Durango T service. The consulting firm studying the project believes tourist fares for the tram could pay for the operating costs. But this seems overly optimistic. The consulting firm is searching for a mix of private and local funding, along with federal transportation money for the initial capital costs. Fort Lewis might want to use electric carts to transport people from the terminus on the rim to central campus.

The Oregon Health and Science University owns the only community to campus aerial tramway in the county. The university provided $40 million of their $57 million construction costs. OHSU oversees operation and city has site and maintenance

responsibilities. This is a much larger tramway than would be needed for FLC. Each car holds up to 78 passengers. The tram costs $4/trip and $100 for an annual pass. Students and faculty of the university ride free. In 2007, the system provided almost 1.4 million rides, with 1.2 million from university students and employees. The net operating cost was $1,150,000.

We believe during Phase 1 more study is warranted and that this project could move forward during Phase 2. Construction would take roughly a year. We believe that such a system could make FLC distinctive and boost enrollment. The Environmental Center will gather data this spring to estimate potential ridership. If the tramway eliminated an average of one vehicle trip per person each week there would be 765 MTCe/year reduction in emissions. Accounting for the electricity needed to run the tramway, we have scaled back this reduction to 616 MTCe/year. As the aerial tramway would be part of Durango Transit, some of the costs would be passed on through the transit contract with the student government. Because these are user fees we estimate the cost to the college itself would be in promoting the service. We have assessed a nominal fee of $1000/year.

Assumptions:
Costs to FLC for this project would be minimal.
We assume the electricity necessary to operate the tramway would be 600 kWh/day *365 = 219,000 kWh. This would account for 151 MTCe/year.

Sources:

Personal communication: Roger Gardner, RG Consultants

Websites
http://www.portlandtram.org/
http://en.wikipedia.org/wiki/Portland_Aerial_Tram

Assist Durango T in improving services for FLC riders Phase 2

FLC should work more closely with Durango Transit to establish exactly what FLC riders want and need. One exercise would be to compare class and bus schedules to see if these need further coordination to increase the convenience of the bus. The Durango T also is moving toward the use of Google Transit, which will provide a routefinding service for people that incorporates bus schedules and walking distances. Durango T has examined the "Next Bus" system that creates a phone number that riders can use to identify when the next bus will arrive at a particular stop. They report that Next Bus is currently too expensive for Durango T. Finally, the Durango T itself would like to create an enclosed bus shelter on campus and install bike racks at key bus stops near campus. Covering these bike racks would provide even greater incentive for people to bike from their residence and then hop the T. We have not assigned costs to the College for this partnership and collaboration.

Personal communication: Roy Petersen, Durango T

Bicycle and pedestrian programs

Provide covered bike parking **Phase 2**

Based on comparisons with other schools there is adequate bike rack space at Fort Lewis College. Covered bike parking, however, would encourage bike riding through the winter, into the shoulder seasons, and during the monsoons over the summer. Rather than a central bike shelter, we feel small covered stations distributed throughout campus would prove most useful. Covered bike parking is becoming more common on campuses and throughout large cities. We estimate five pre-fabricated, metal structures each holding approximately 10 bicycles, would serve the initial needs of the campus. Costs for shelters range from $2,500 to $14,000. We estimate a price of $10,000 each. There are several different models with some attached to buildings and others being free standing. We believe should be included in the phase two of a TDM program with a new bike shelter added each year.

Sources:

Website and Personal Communication: Park-a'-Bike, CU-Boulder
Websites: Evergreen State College, UBC, UC-Davis

Bicycle shuttle to get cyclist up to the hill **Phase 2**

A perceived major impediment to increasing bike ridership is the steep hill. The new bike path up Goegline Gulch Road is helpful but the change in elevation still provides a disincentive to biking. A potential solution is bike shuttle program modeled after a highly successful program at UC-Santa Cruz. The program at UCSC consists of three passenger vans and a shuttle bus equipped with 16-bike trailer that transports cyclists from downtown Santa Cruz up a hill to campus. This idea came up in our study circles but the Durango T director expressed concerns about hauling a trailer behind the Durango T buses. At the same time, an FLC-run system has the potential to reduce ridership on the Durango T. We propose working in partnership the Durango T on a solution. Most promising is running a pickup truck with a bike trailer behind Durango T buses going up Goegline Gulch Road and North College Drive. Students felt that running this service between 7:00 a.m. and 10:00 a.m. would work best alternating between a loading zone at 8th and 8th and North College Drive and Florida Road. The bike trailer at UC-Santa Cruz holds 16 bikes and could prove useful during breaks and over the summer for OP and Adventure Ed trips to regional locations.

Additional research is necessary to gauge the impact of such a program and whether a bike shuttle service would indeed encourage people to drive less. Emissions from running the shuttle would also need to be factored into the GHG emissions. The UC-Santa Cruz reports that the high ridership (currently an average of 151 passengers/day) is

the key to gain a GHG reduction. They estimate the shuttle has reduced parking demand by 15%. If an FLC shuttle achieved half the impact of the UCSC program it would reduce GHG emissions by roughly 165 MTCe/year minus the emissions of the trailer, which we estimate at 2 MTCe/year. We have estimated based on the UCSC program.

Assumptions:

- Shuttle reduces drive alone trips to campus by 7%.
- GHG emissions associated with the vehicle and trailer. Assuming 12 miles total travel between 8th and 8th and North College Drive bus stops over a three hour period, and a gas mileage of 12 mpg, the van and trailer would use one gallon of gas each day. Over 210 school days, this would generate 1.89 MTCe.
- FLC pays for trailer ($20,000) and Durango T provides the vehicle and driver.

Sources:

Personal communication – Larry Paegler, Director UC-Santa Cruz TDM program

Facilitating bicycle purchase **Phase 1 - study**
Phase 2

There are several ways to facilitate students getting their own bike. At several schools confiscated bikes are auctioned off to students. The University of Washington sells 100 abandoned bikes a year; UC-Davis holds two bike auctions with over 300 bicycles available at each event. The University of Victoria-British Columbia gives away bikes through its Spokes Program. These can provide bicycles for people looking for inexpensive ways to get around. There are a number of partnership opportunities available with the emerging bicycle cooperative in town.

At the opposite end of the spectrum is the prospect of partnering with a bike manufacturer to provide high-end bicycles to incoming students at a discount. Emory University and Ripon College have done this. With the success of FLC's cycling team, such a program could be a natural partnership for a bike manufacturer.

Finally, several campuses provide no-interest bike loans. UC-Santa Cruz will loan up to $750; the University of Montana loans $400 over a 12-month period. Such programs could operate with a minimal subsidy from the College. We believe all these ideas show promise and deserve study to understand which would work best at FLC. For this reason, we recommend study in Phase 1 and implementation in Phase 2. We allocate $2,000 to implement one or more of these programs.
Sources:

Websites: UC-Santa Cruz, UMT, UVic, UC-Davis, University of Washington, Emory University, Ripon College.

Scheduling

Flexible scheduling **Phase 1 - study**
Phase 2

Flexible scheduling strategies such as telecommuting and a compressed work week can result in large GHG reductions. General research suggests if 10% of employees telecommute one day a week, overall trips to campus go down by 2%. If 30% participate, this can move up to 7-8%. Since many faculty already work from home on days they are not teaching, the focus for these programs would be on staff, who as a group has the largest per person per trip impact on GHG emissions. For FLC, 30% participation by staff would reduce GHG emissions by 30-40 MTCe per year. Flexible scheduling can also make working at FLC more livable. Current state requirements, however, might make this unworkable. We have used an estimated reduction of 35 MTCe for a flexible work schedule program implemented in phase 2 of the climate action plan.

Sources:

"Employer Outreach TERM Measurement Process" – Presentation by Commuter Connections, January 15, 2008.
Personal communication – Larry Paegler, UC-Santa Cruz, TDM Manager

Fleet Management

Reduce use of fleet vehicles **Phase 1**

Reducing use of the FLC vehicle fleet would result in very modest GHG reductions. Analysis by specific department shows that grounds vehicles and police vehicles generate 28 MTCe and 30 MTCe respectively. The rental pool generates approximately 20 MTCe/year if you account for fuel purchases that take place off campus.

In terms of the types of vehicles, equipment in the fleet (snowplows, dump trucks, mowers, etc.) general 53 MTCe/year. Pickups generate 37 MTCe and four cars generate 31 MTCe, with most of this coming from the Chevrolet Impala that the police use as a patrol vehicle. Vans (passenger and utility) generate 25 MTCe.

While it is worth considering how to reduce vehicle use, the gains would be modest. The existing policy already channels departmental vehicle use toward the rental pool in order to reduce the number of vehicles on campus. Some campuses have replaced vehicles with bicycles for certain functions, but our campus is already quite small and most plant vehicles haul equipment and tools that wouldn't be possible on a bike.

The one place where the College could achieve a no-cost savings is by establishing a "no-idling" policy. Idling vehicles to warm-up the engine or the cab in the winter or cool the cab in the summer is routine. Research suggests that idling light- and medium-duty

vehicles use a gallon of gas per hour. If vehicles are left to idle on average 15 minutes a day, this would generate a ½ ton of MTCe per year. While a fraction of our carbon footprint, this is an easy way to reduce our impact.
Assumptions:

Figures calculated based on a report for use of the FLC fuel tanks from November 1, 2007 to November 19, 2008. Total gallons multiplied by 0.95 to gain estimate for a calendar year. Average fuel prices over this period were $3.51/gallon of gas and $4.03/gallon of diesel.
Rental pool vehicles receive 10% of their fuel off-campus
In calculating cost and emissions information we distinguished between gasoline and diesel.

Sources:

Note: need reference on impacts of idling.

Use alternative fuel whenever possible in the vehicle fleet Phase 2

In 2006, gas stations shifted to the use of ultra-low sulfur diesel fuel. This new diesel mix has lower particulate emissions and 20% fewer greenhouse gas emissions than older blends. Brennan Oil confirmed that Fort Lewis College receives the ULSF in its diesel tank. During our study period we used 3,080 gallons of diesel fuel and generated 31 MTCe

Replacement of this with B20 biodiesel would result in a modest reduction of 6 MTCe/year. Use of B100 would eliminate all but a small fraction of the GHG emissions from diesel. Biodiesel is currently not available in Durango except through a few individuals who produce it in small batches for personal use. The San Juan Bioenergy plant in Dove Creek will have the capacity to produce biodiesel once market conditions make it more profitable and there is talk of production through an algae-based natural gas treatment facility in Ignacio. As conventional fuels become more expensive and the government moves toward more additional investment in alternative fuels, local or regional production might be more attractive. We believe that it's worthwhile for the college to explore producing its own biodiesel (see below). Currently there is a small premium for biodiesel over regular diesel fuel.

There are anecdotal reports about adverse impacts of biodiesel on engines during the winter. These deserve to be investigated, but without availability it is difficult to move beyond conjecture. Middlebury's climate report suggested that you can adjust diesel engines to function properly in cold weather for $500/vehicle.

Similarly, ethanol or "flex fuel" is also not available in Durango. We also anticipate this changing. Use of E85 in vehicles that accept this fuel can significantly reduce tailpipe emissions, though when you account for emissions associate with production of E85 the total reduction hovers between 10 and 20%. E85 reduces vehicle efficiency, our staff

said by as much as 30%. Biomass blends produced from switchgrass and sugarcane are better in this regard than corn-based ethanol. One problem is that using E85 on campus would require another gas tank. Alternatively, the College could work out an agreement with a local fuel station guaranteeing that we will fill our E85 vehicles at their station. This might encourage the station to carry the fuel.

Sources:

Department of Energy analysis of carbon emissions for alternative fuels
"The Impact of Alternative Fuels on Greenhouse Gas Emissions – A Well-to-Wheel Analysis" Tiax, LLC

Produce biodiesel on campus **Phase 1**

Appalachian State University in North Carolina received a grant from the EPA to set up a small closed-loop biodiesel processing facility on their campus that provides necessary energy inputs, recycles all byproducts, and therefore minimizes pollution. The objective of this student-led initiative was to provide a meaningful and influential educational tool that could be directly incorporated into the ASU curriculum and serve to teach the surrounding community.

The project included the construction of 384 square foot structure for production, a solar thermal greenhouse to reduce energy inputs, and a wastewater treatment system. The project took advantage of 2400 hours of student volunteer labor. The group successfully produced 195 gallons of biodiesel in its initial run. They completed the entire project for less than $40,000 using donated recycled vegetable oil. They estimated the facility could produce 21,000 gallons a year at a cost of $0.75/gallon with some additional annual costs for upgrading and replacing equipment.

The efficacy of constructing a biodiesel plant at FLC depends on the initial capital costs, the annual operating costs of such a facility, including the cost of maintenance. Fort Lewis uses approximately 3,080 gallons of diesel fuel each year. Looking the different diesel vehicles, their uses, and the time of year they see the most use, we believe that 25% of the 3080 gallons could be replaced by B100, 7% by B50, 46% by a B20 blend. We have assumed that we could not use biodiesel during the middle of the winter, meaning that snowplows would continue to operate on regular diesel fuel. With this profile of diesel use we could replace 1171 gallons of purchased diesel fuel by producing 2600 gallons of biodiesel. These numbers are not the same because B20 and B50 blends use 80% and 50% of regular diesel fuel, respectively. This would save the College $4322 per year.

Sodexho currently produces 40 gallons/week of recycled oil. This totals 1200 gallons during the academic school year. More oil would be forthcoming during July, the month that large conference groups descend on the College. Sodexho currently donates this oil to San Juan Bioenergy. FLC could get additional oil through partnerships with local

restaurants. At Appalachian State they also made soap from the glycerin byproduct. Other schools we found producing their own biodiesel are Sinclair Community College, Dickinson College, and the University of Kansas.

An initial assessment suggests that if we can keep operating costs to $0.75/gallon, the rate of return to the college would be six percent and a payback time of 16 years. If you budget an additional $1,000/year to pay for equipment upgrades and maintenance, however, the rate of return goes down to 4% and the payback time goes up to 26 years. Keeping production costs low and lowering the initial materials costs through donations or grants would make such a project much more feasible. The Appalachian State project has a larger production capacity than we need. Lowering the up front costs for construction by $20,000, either through making it smaller or through a matching grant would raise the return rate to 8%.

Such a project could serve as an effective training project with Engineers with Borders, especially since not all of the students in the group are able to go overseas. If the facility generates a surplus this could help to fund their trips. Seven classes used the demonstration project within their curriculum at Appalachian State. Finally, replacement of our diesel fuel consumption with biodiesel would move the College toward meeting the Governor's executive order of 25% petroleum reduction by 2012. In addition to the 3,080 gallons of diesel used during a year, Fort Lewis uses roughly14,827 gallons of gasoline per year. Cutting diesel use by 1171 gallons is a reduction of almost 7%.

In short, there is potential to serve both programmatic and sustainability goals while saving the College money. The Environmental Center is continuing to explore this option and ways to reduce up front materials costs. We believe this deserves consideration in Phase 1 of the College's climate action plan.

Assumptions:

- We assumed the same $40,000 cost for constructing the facility, though the most biodiesel we would need to produce would be roughly 2600 gallons and this would require a smaller facility and cost less. If we could find existing building space on campus costs could go down further.
- There is roughly a one-to-one ratio of recycled vegetable oil to produced biodiesel.
- The cost of $0.75/gallon is constant and doesn't change with production volume
- We used the average price of diesel fuel over our study period, $3.69/gallon in calculating costs.

Replace the current vehicles with alternative fuel or higher-efficiency models **Phase 3**

Environmental Center staff compared the replacement of the current vehicles in our fleet (a business-as-usual scenario) with the purchase of a range of alternative fuel vehicles currently available on the market. We included in the analysis vehicles on the most recent state procurement contract. We broke this analysis down by vehicle type to come up with the most cost-effective, emissions-reducing scenario for fleet turnover. In the

course of this research, we discovered a highly dynamic market. Some alternative vehicles that were sold in the past are no longer available in the market. Other vehicles are in development and expected to enter the marketplace in the next year. With such a dynamic marketplace, our research is useful only as a snapshot. Within five years, the choices for alternative vehicles will be very different. We have played these scenarios out with the current technology to see what kind of emissions reductions are possible and how much they will cost.

Based on our research we recommend the following replacement scenarios:

Passenger vans – Ford Econoline E-150 – FFV
Will save 13 MTCe/year once E85 becomes available in the area and has a positive cost-offset ratio of $1177/MTCe

Utility or Cargo vans - Dodge Grand Caravan
This van doesn't use alternative fuel but gets higher gas mileage and will reduce GHG emissions by 3 MTCe/year. The cost offset ratio is $950/MTCe.

Light pickups - Zap XL Electric Truck
Oregon State has a Zap Truck. They are cost competitive but not widely produced creating a concern over availability of parts and maintenance. Oregon State recently did an evaluation of a number of electric trucks and settled on an electric model produced by Miles Automotive in Southern California for $19,995 and have a payback period of just over 15 years. The Zap Trucks are $14,500, would reduce GHG emissions by 14 MTCe/year and have a positive cost offset ratio of $208/MTCe

Heavy pickups - GMC Sierra 2500HD - diesel
These are less expensive than a straight replacement of our current gas vehicles. Using conventional diesel these trucks would generate 14 MTCe/year more than our current vehicles, but with B100 they would generate 13 MTCe/year less. If we can produce B100 on campus, these pickups are the best investment.

Cars – Volkswagen Jetta TDI
For the three standard passenger cars replacement with the Volkswagen Jetta TDI will reduce emissions by 2 MTCe/year running on regular diesel because of its higher fuel economy. Running on B100 will yield a reduction of 4 MTCe/year and has a positive offset ratio of $45/MTCe.

Patrol Car – Chevrolet Impala FFV
The standard police patrol car is available in a model that takes flex fuel. It is $5,000 more expensive but once it can run on flex fuel will reduce emissions by almost 10 MTCe/year. It has a negative cost offset ratio of $202/MTCe.

Golf Carts - Columbia SUV-S Electric
This cart is cost competitive with gas powered carts. Replacement of our current carts would save ¼ MTCe per year. This has a positive cost offset ratio of $592/MTCe though

this does not include the cost of battery replacement, which is often unknown on electric vehicles.

The alternative fuel SUVs we looked at were too expensive to consider. We also could not find alternatives for our four passenger buses, though two are diesel and could switch to B100 with a fuel production facility on campus. We also collected information on compressed natural gas vehicles, but the emission savings did not seem to justify the cost of installing a CNG refueling station on campus. Plug-in hybrids have very limited availability and we could not find solid information on costs and fuel economy.

If both E85 and B100 were readily available, complete turnover with the vehicles listed above would reduce the carbon footprint of the fleet by 67.25 MTCe/year. This is a 38% reduction. While this is the most optimistic current scenario, we expect more efficient vehicles to be on the market soon. Because it takes many years to turnover the entire fleet, we have counted the reductions from this strategy in phase 3 of the climate action plan.

Assumptions:

Estimates of GHG reductions are for turnover of the entire set of vehicles not per vehicle.

Sources:
DOE Alternative Vehicle and Fuel Website
Manufacturer websites

Not Recommended

Bike repair and tune-up services **Not recommended**

CU-Boulder employs a bicycle technician through their on-campus Bike Station as well as a mobile bike doctor who can't make it to the station. UBC's bike kitchen also functions as a repair shop. While it would be more convenient to offer these services on campus, Durango already has several bike shops that can provide these services. The role of a bike program on campus should be to teach people how repair their own bike, and so we do recommend this strategy.

Sources:

Websites: CU-Boulder, UBC.

Establish a "yellow bike" program for Durango and FLC **Not recommended**

A yellow-bike program typically distributes free bicycles in a community. All are painted the same color and are available for unlimited use by whoever needs them. Riders leave them around town when they are done for the next person to use. These communities have only been successful in a handful of communities as most often the

bikes quickly disappear. This is what happened in Durango several years ago.

We recommend a check-out system for bicycles. At UBC and the University of Waterloo, a variation of the program exists where members form a co-op and pay money or volunteer to gain access to specific and secure locations where the community bikes live. The University of Montreal uses special locator chips in their bikes to keep them from disappearing. Such a system can be more self-regulating than a check-out system on campus and also would involve the community. While we like this idea, we don't recommend this as a campus-run program.

Sources:

Websites: University of Waterloo, UBC, University of Montreal, University of Washington.

Provide a campus shuttle to complement Durango T service Not recommended

Some campuses provide their own shuttle service in addition to free public transit. Western Washington University provides a late-night shuttle service until 2:30 a.m. The University of Washington contracts out their night shuttle service. It provides 128-160 rides per day at a cost of roughly $200,000. The UBC shuttle system provides connections to specific attractions around campus and town that are not located near transit. Evergreen State had a "Greener Greeter" van that would pickup visitors and take them around campus. We feel that other strategies should receive a higher priority at FLC. A regular weekend shuttle to the ski area, for example, might encourage students to forego having an automobile on campus.

Personal communication: transit coordinators at University of Washington, Western Washington University and Evergreen State College.

Banning first-year students from bringing cars to campus Not recommended

While we don't want to encourage having first-year students bring cars to campus, this would likely have a negative impact on recruitment. Other campuses have success with this policy if they provide alternatives. UCSC provided carsharing services through Zipcar while banning cars from first- and second-year students. This has worked very well for them. Their hope is that older students will continue to use Zipcar and forego bringing cars on campus as a result of the program. The impact of banning first-year student cars could be large. Middlebury proposed banning cars for freshman and sophomores; they estimated that this would cut emissions by 30% and calculated a $5,000 cost for enforcement.

Sources: Personal communication Larry Paegler, UCSC Transit Coordinator

Other GHG Sources and Offsets

Encourage videoconferencing **Phase 1**

We currently do not have a good way to track the emissions associated with official trips off-campus. As we solve this problem our carbon footprint will increase. One strategy to deal with emissions associated with official long-distance travel is to promote the use of videoconferencing. Berkeley estimates that increased use of videoconferencing facility could save $75,000/year in travel costs and reduce GHG by 114 MTCe and have a cost offset of $348. There are at least two videoconferencing rooms on campus. Videoconferencing is also becoming a more regular feature of Internet service. What is needed is increased promotion of this option to the campus community.

Sources: UC-Berkeley Climate Action Plan

Reducing waste and increasing composting **Phase 1**

The waste reduction targets in the Sustainability Action Plan would significantly reduce our greenhouse gas emissions. If we were to bring our diversion rate in line with other top schools and boost composting to 5% of the waste stream, we could reduce our emissions by 351 MTCe per year. This would require a modest up front investment of $3500 in the waste reduction measures listed in the action plan and suggests that waste reduction and composting should be a priority for the school. The key investment in waste reduction is the purchase of a truck scale and the changing of the waste contract to a pay-per-pound system. This would help us track our progress reducing waste and give the College community a strong incentive to participate. This would cost the school between $40,000 and $60,000, but is a prerequisite to really reducing our waste.

Sources:

Calculations based on the Clean Air-Cool Planet calculator of GHG emissions from one ton of landfill waste.

Reduce use of fertilizers **Phase 1**

There is potential to reduce the use of synthetic fertilizers on campus through a combination of organic fertilizer, such as compost or manure, and compost tea applications that encourage healthier grass and soil. Willamette University has successfully reduced synthetic fertilizers by 90% by becoming expert at applying mixes of organic fertilizers and compost tea blends tailor to their soil. We estimate that a $1000 investment in compost tea production, an expanded composting operation, and manure collection, would allow a 50% reduction in fertilizer use save the College $2000 per year. This would reduce greenhouse gas emissions by 7 MTCe per year. This has one of the best cost offset ratios of the all the strategies listed

Sources:

Personal communication with Willamette University

Carbon sequestration on campus lands **Phase 1**

While carbon sequestration is important, there is very little we can do to reduce our GHG footprint other than to try to preserve the undisturbed land that we have access to on campus, in Horse Gulch, and at the Old Fort. Most of carbon sequestration takes place in the soil. Disturbance such as plowing or cutting trees degrades the soil and drastically reduces its ability to sequester carbon. To count sequestration against our GHG footprint we must actively manage or enhance the landscape to increase sequestration. The rates for this enhancement or even restoring an area through tree planting are very low, especially in our dray and cold climate.

Purchase Renewable Energy Credits **Phase 4**

The College will be purchasing its first renewable energy credits (RECs) this year as part of its LEED application for Animas Hall. This will reduce our GHG footprint to a small degree. RECs, however, should always come after conservation, efficiency, and on-site renewable energy production. Because of this it is not recommended until the Phase 4 of the process.