Draft
UAF Campus Sustainability Plan

By the students in
NRM 430: Resource Mgmt Planning

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Spring 2008

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"Each of us has a part to play in sustainability… What piece of the puzzle do you hold?"

—David J. Skorton, President, Cornell University

1. Introduction

Just rough ideas for the introduction…

A sustainable campus community acts upon its local and global responsibilities to protect and enhance the health and well being of all humans and ecosystems. It actively engages the knowledge of the university community to address the ecological and social challenges faced both today and many years from now. Academic freedom provides the ideal conditions for inspired innovation. Universities, long regarded as bastions of free thought, are theoretically unparalleled in their ability to apply new theories, technologies, and values. As such, it is incumbent upon universities to lead by example in areas where creative problem solving is necessary

—Lindsay Cole, Canadian Sustainability Assessment, 2003

Proposed UAF Sustainability Vision:

We strive to be a model of stewardship for the environment by incorporating the ideals of sustainability into virtually every facet of campus life.

ROUGH ideas for the intro

Energy- Create a net zero Green House Gas emissions (GHG) campus through energy efficiency, conservation, and procurement of clean and renewable energy.

Transportation- Achieve a net zero emission status for the campus by providing housing proximity opportunities for many faculty, students, and staff; increasing trip reduction strategies; transitioning to non-petroleum based transportation; developing telecommuting and teleconferencing, and integrating emerging technologies.

Built Environment- Create superior places to study, work and live that enhance the health and performance of building occupants through sustainable planning, design, construction, operations, retrofits and biomimicry. Include dormitory and building competitions to motivate people to reduce water and energy consumption.

Procurement - Employ efficient procurement strategies, processes, and systems for the acquisition and responsible use of resources in a manner that supports a “triple bottom line” of economy, society, and environment.

Waste - Reduce and ultimately eliminate waste on campus with the ultimate goal of a net zero

waste campus.

Food- Create a local and organic closed loop food system by observing sustainability criteria for all food purchasing, preparation and service, cleaning, waste disposal, and purchase of equipment and supplies.

Landscape/Biotic Environment- Protect and maintain the natural campus environment through restoration, preservation, and education while enhancing the campus as a classroom. This includes recreational areas, building landscapes and native habitat.

Water- Reduce potable water use while protecting and conserving all water resources within the campus watershed through implementation of efficiency measures, collection technologies, re-processing and re-use.

2. Conserving Energy

By Rune Fjellseth

Travel has become a thorny problem now for environmental reasons. In the last few years, as we've learned about the extent of climate change and global warming, it's gotten much harder to just blithely dismiss getting on an airplane and flying around the world. That one airplane trip to wherever you are going requires the consumption of more fuel and more carbon than most people in the world will use in a year for all the tasks of their daily life—not to be taken lightly.

-Bill McKibben, Middlebury Scholar-in-Residence in Environmental Studies
(Interview by Sherry Schwarz and Stacey Woody Thebodo: www.abroadview.org/green/

The purpose of this project was to see what is being done on campus when it comes to sustainability. Is the campus working to be sustainable today, and in what areas are they doing the best job, and in which areas do they need to make a bigger effort. Furthermore the project should lead to a process where we considered what could be done on campus in the future to make it more sustainable.

1.1. Introduction

This project that we have been working on for this spring semester has given us the opportunity to learn a great deal about what sustainability means to people in the public, students and faculty at this University. Through research and the process of getting information about sustainability we have been fortunate to learn more about what other universities, colleges and institutions are doing when it comes to sustainability and green thinking. For me, as a foreign student it has also been an interesting learning process where I have been able to learn a lot about how the American students and the American people in general perceive the concept of sustainability. Especially in my chosen field, energy, the differences in people's mindset from the European continent to the North American continent is very big and this has given the project work an extra meaningful dimension to me. It has given me a better understanding of the American people and the way they think.

A large Campus like the one here at UAF has a large demand for energy. Many people and equipment are reliant on large amounts of energy to function on Campus every day. The Campus both use and produce power and are in that way self sufficient and can be called semi-sustainable. But what is really being done, if anything to focus on energy amongst students and staff?

Actions Individuals Can Take:

- Use public transportation whenever possible.
- Reduce, reuse and recycle.
- Turn off all electricity before leaving the room/apt./bathroom, etc.
- Measure your carbon emissions: minimize them and then offset the remainder (contact us if you would like more information about offsetting your carbon emissions).

My paper will be divided into two parts; one about the current situation at UAF and the second part will be focusing on what they can do in the future and what we would like to se them do. The field of "energy" is a very large area to cover and ranges through subjects like water, electricity, fuel consumption and buildings. I will in this draft limit the field and will not include water, buildings and transportation (fuel consumption) because these are individual topics that other students in the class are focusing on.

Current Situation

The total energy consumption on campus today is close to 56,000,000 kwh/year. The department in charge for the energy here at UAF is the UAF Facilities Service, Division of Utility. Located in the Power Plant at Alumni Drive. The Division of Utility's mission is:

Our mission is to provide high quality uninterrupted service of water, power and heat and chilled water. This mission is accomplished through a commitment to preventive maintenance, planning, and inspection. (http://www.uaf.edu/fs/utilities.html)

The Division operates the combined heat and power plant which consists of two coal fired and two oil fired boilers. All the boilers have a power generating capacity of 23 MW. Most of the time, the two coal boilers and one oil boiler are running. One of the oil boilers are also made to run on natural gas but this is a source that has not been fully developed as an alternative at UAF. The prices for coal versus oil at the moment are the main reason behind the choice of coal as the number one fuel source.

The plant was built in 1964 and one of the biggest economic challenges today is to maintain and try to keep the production as efficient as possible. A lot of technology has changed since 1964 and new control systems and management devices are constantly being replaced with new ones to boost as much efficiency as possible out of the plant. In addition to what they produce themselves they are also forced to buy power from Golden Valley Electrical Association in the periods of the year where the energy consumption peaks. Golden Valley also burns coal to produce energy. Here are some numbers on how much of the natural resources the Power Plant consumed last year.

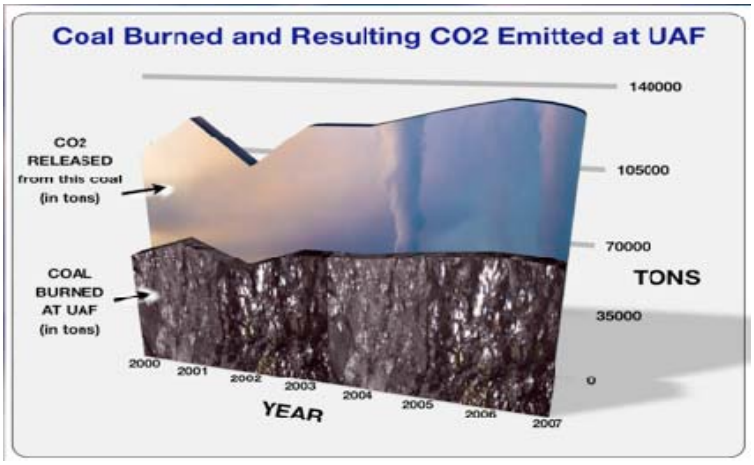
The power produced at the power plant is vital to life on campus. But in the process of making this energy the two large coal burners and the oil and gas burners produced close to 145,000 tons of CO2 last year. The plant controls the emission of particles into the air, but at the current time, there are no techniques being used to capture the CO2..

Oil and Natural Gas Burned at UAF Powerplant, 2000-2007

Year	OIL (gal)	Resulting Carbon Dioxide Emitted *	Natural Gas (mcf)
2000	1,237,786	13,739	0
2001	808,087	8,970	0
2002	1,407,920	15,628	0
2003	858,955	9,534	0
2004	1,588,062	17,627	0
2005	1,327,302	14,733	0
2006	1,050,869	11,665	0
2007	1,222,813	13,573	13,540
Change 2000 to 2007	0	0	13,540
% Change 2000 to 2007	-1%	N.A.	N.A.
Assumes 22.2 lbs CO2 per gallon of heating oil http://www.epa.gov/OMS/climate/420f05001.htm			

Coal Burned and Resulting CO2 Emitted at UAF

	YEAR								Change 2000 to 2007			Doubling Time
	2000	2001	2002	2003	2004	2005	2006	2007	TONS	% change in 7 years	% change per year	If this rate continues
COAL (tons)	56,830	66,155	54,784	68,377	65,896	69,666	72,625	69,751	12,92[1]	23%	3.25%	22 years
CO2 Released (tons)	105,568	122,912	101,785	121,468	122,431	129,436	134,933	129,594	24,006			



Source: Chilkoot Ward, Manager at UAF Power Plant

The construction of most heat and power plants limits its ability to condense steam and in the warm summer months the plants efficiency drops to 32%. This means that most of the energy and the steam that the plant produces goes straight back into the air and is not used at all. In addition to this, Facility Services generally starts running air-conditioning in the large campus buildings in the beginning of February—a month with an average temperature of - 3.6 °F (- 19°C). At that point, the solar gain heats the buildings so much that they need to run air conditioning.

An example from Middlebury College in Vermont from 2006 – 2007, shows the effects of turning down the thermostats. The students decided to lower the temperature in the dorms from 70 °F to 68 °F. The following was written in the report after the test period was over:

"This small change makes a significant difference over the period of November through March in a typical winter we will lower our fuel costs by nearly $50,000 and send 800,500 fewer pounds of climate warming greenhouse gases into the atmosphere."(www.middlesbury.edu)

Middlebury College has almost the same number of students living on campus as UAF. And it is important to notice that these numbers are only from the dorms on campus, and not from the office buildings and educational facilities.

Facility Services have provided me with the information that they have replaced over 90 % of the light bulbs on campus with Compact Fluorescent Light Bulbs (T-5 and T-8), which has reduced the energy consumption for lighting by more than 30%. Replacing the light bulbs is an easy and efficient way to reduce energy, and this is an action that is possible for all to take. This is information is taken from the federal webpage energystar.gov:

"If every American home replaced just one light bulb with an ENERGY STAR qualified bulb, we would save enough energy to light more than 3 million homes for a year, more than $600 million in annual energy costs, and prevent greenhouse gases equivalent to the emissions of more than 800,000 cars."

UAF is currently supporting the Golden Valley Electric Association in their Sustainable Natural Alternative Power program (SNAP). This program offers the opportunity for students and people in the area to invest in the future of renewable resources. But the initiative made by UAF is not great and I would really want to see the University getting more involved in this. They could at least provide better information to the students who might be willing to take actions towards more renewable resources.

2. What do can be done in the future?

UAF's energy consumption contributes to the rising pool of greenhouse gases. Since we are the nation's Arctic University and the Arctic is feeling the effects of climate change more dramatically than the rest of the country, it is appropriate that UAF should take a leading role in the effort to reduce greenhouse gases.

There are a big potential in educating people in how to reduce their energy consumption. In a place like UAF where there are a lot of high-energy demanding equipment and where there are a lot of people consuming energy all the time, small adjustments made by the individuals can make a big difference through a year. It is not only the Facility Services job to cut on the energy use; it is also the students, staff and faculty's. But a lot of the students lack information about how they can contribute and most importantly, how their actions can affect the campus's energy use and the environment. I think the Facility Service should address this problem and work together with all groups on campus on this, because I think a lot of the people on campus are willing to do their share of sacrifices to make changes happen.

The Director at the plant, Charles Ward is working against a more efficient and sustainable plant that will be able to make use of more of the energy that they produce and by greater sustainable means than today. He wants to use the technology, the know-how and the status the University has to head a campaign for renewable resources as fuel for large power plants. The increasing demand for power on campus has led to that new plan for a fifth boiler is in place, but it will not be happening for at least five years. The new boiler will be able to burn solid fuels such as wood chips, biomass and debris created by the boilers that are operating today. It will also be able to burn the emissions from the boilers several times and the final emissions of CO2 and particles will be drastically reduced. But what will happen are still just another unanswered question and the biggest problem for the Utility Division when it comes to renewable resources and sustainability is the ruling powers of the state government. The state generates huge amount of money from their coal resources, and as long as the resources are available they are not interested in developing something new. The coal, oil and natural gas resources in Alaska will last for many years to come, and as long as this creates the revenue on the state financial papers nothing will probably be done from their part.

But this does not mean that the University has to resign and admit that it is a lost battle. Many other Universities in the US has come up with innovative and smart solutions to reduce energy consumption, be more environmental friendly, raise awareness and save money. And a campus campaign to switching to Compact Fluorescent Light Bulbs or switch off electrical equipment when not in use can be a good beginning for a larger scale change both on campus and in the rest of the society.

We would also like to see UAF sign the American College and University Presidents Climate Commitment. This commitment sets forth some common goals and some ground rules for the members to follow and work against. So far close to 550 institutions around the world have signed this agreement and are working together to reduce carbon emission and to reduce the effect of greenhouse gases. I think that the students, faculty and staff at UAF should demand that the University signed this commitment as soon as possible. I think something else would only be a total lack of respect for the environment and the students and public of Fairbanks (appendix 1).

Here are just a few good examples of innovative energy reduction actions being made by other large educational institutions in North America and the Arctic areas:

- ·Warren Wilson College in North Carolina has turned all street lamps into PV Powered lamps with solar panels on each lamp that provide the one lamp with enough energy to last through the dark hours of night.
- ·Middlebury College in Vermont is going to get large portions of their energy from biomass. They are building a new power plant where they will burn only wood chip from a local wood mill.
- ·Middlebury College will be carbon neutral by 2016
- ·Carnegie Mellon University will by the end of this year get over 20 % of their energy from renewable resources like wind, hydropower and landfill gas resources.
- ·An energy and water upgrade at the University of British Columbia in Vancouver reduced CO2 emissions by 15,000 tons a year.
- ·My home university, Norwegian University of Life Sciences, UMB puts environmental aspects in front of the economical aspects in every purchase possible.
- ·University of California Santa Cruz (UCSC) purchases 100% renewable energy. However, they have wind, solar and tidal power sources readily available.

Why Use a CFL?

NPR.org, February 8, 2007 ·

According to the federal government, if every American home replaced just one light bulb with an Energy Star approved compact fluorescent bulb (CFL), the United States would save enough energy to light more than 2.5 million homes for a year and prevent greenhouse gases equivalent to the emissions of nearly 800,000 cars.

Energy Star is a joint project with the Environmental Protection Agency and the Department of Energy that promotes energy efficient – and thus climate-friendly – products. But not all CFLs are created equal. Here, some tips from Energy Star about what to look for and where to use a CFL:

The Benefits

— Energy Star qualified CFLs use at least two-thirds less energy than standard incandescent bulbs and last up to 10 times longer (average lifespan of a CFL is five years).

— CFLs save $30 or more in energy costs over each bulb's lifetime.

— CFLs generate 70 percent less heat, making them safer to operate.

Where to Use

— To get the most energy savings, replace bulbs where lights are on the most, such as the family and living rooms, kitchen, dining room and porch.

— Install them in hard to reach fixtures, like ceiling fans.

— Make sure the CFL matches the right fixture by reading any restrictions on the package. Some CFLs work with dimmers, others are specially made for recessed or enclosed fixtures.

Myths

— CFLs have a harsh, cold light quality. Increasingly, this is less of an issue. Over the past few years, manufacturers have worked to provide a warmer color. Some people say they still notice a difference, but the gap is narrowing. For a warmer, white light, look for a color temperature of 2,700–3,000K on the package.

— CFLs aren't for bathrooms. Not necessarily. CFLs can work in bathrooms, but humidity may shorten the bulb's life.

CFLs can't be used in older houses. In fact, CFLs may work better than incandescent bulbs in houses with older wiring; CFLs generate less heat and draw less electrical current.

http://www.npr.org/templates/story/story.php?storyId=7431198

1.2. Energy: Vision

Reduce energy use in existing buildings by 10 percent in three years and reach 1990 levels within five years. The reduction would be achieved by controlling growth, developing incentives to reduce usage, encouraging the campus community to be more energy conscious and stimulating investment in energy-saving measures.

UAF commits to meet the emissions reduction targets of the Kyoto Protocol, which would reduce UAF's greenhouse gas (GHG) emissions to 1990 levels. The Kyoto Protocol requires this to occur by 2010, but since we are getting a rather late start, we commit to do this by 2015.

Sweden has committed to eliminating its use of fossil fuels by 2020. If an entire country can strive for such a lofty goal, UAF can surely strive to meet the Kyoto Protocol by 2020.

1.3. Goals

We will reduce non-renewable energy consumption on campus through energy conservation and procurement of renewable energy resources to reach the vision of reducing GHG emissions to 1990 levels by 2020.

·Reduce CO_2 Emissions

·Reduce Total and Per Capita Energy Consumption

1.1.1. Reduce CO2 Emissions

1.1.1. Sign the American College and University President's Climate Commitment

Join 545other colleges and universities in signing the American College and Univeårsity President's Climate Commitment. The commitment has strong energy efficiency goals as part of its pledge to become climate neutral as soon as possible. The University of Alaska Anchorage signed the commitment in 2006, the entire University of California system, four California State University campuses, Michigan State and many others have signed on. Burning coal is much more carbon (CO2) intensive than other fuel sources and also a major source of polluting SO2, reactive nitrogen, particulates and toxic metals like mercury.

1.1.2. Generate an increasing proportion of our power from renewable resources.

A sustainable energy system runs, as much as possible, on energy “interest” (e.g. solar, wind, biofuels), rather than energy “principal” (i.e., fossil fuels). [ST1]In the next power plant expansion, Facilities Services will add a solid fuel-fired boiler that can burn a variety of fuels, from coal to wood chips. Make the leading powers understand that environment is just as important as money. Coal is one of the dirtiest fuels and it also creates more carbon dioxide than oil or natural gas. Therefore, it is important to move away from coal as our primary fuel source.

1.1.3. Complete a Campus “GHG Reduction Plan” by 2010.

·Create a campus Energy Team composed of professors and energy [ST2]experts as well as interested students, faculty and staff. Consider hiring a campus Energy Manager who will be a member of the team. Have people in the team that will keep the commitment for the entire period.

·The Energy Team will use the American College and University Presidents Climate Commitment recommendations and its own expertise to develop a plan to reduce emissions to 1990 levels by 2020.

·We recommend the following interim targets.

By 2012, reduce greenhouse gas emissions to 2000 levels

By 2015, reduce greenhouse gas emissions to 1995 levels

By 2020, reduce greenhouse gas emissions to 1990 levels

Develop a variety of funding sources and financing alternatives for energy efficiency, renewable energy, and clean energy projects at UAF.

·Campus energy use is not cheap, but these energy conservation efforts can save money (see "What other schools are doing" below).

·The trend over the last decades has been one of escalating energy use and cost. As the price of energy increases, it will be imperative for campuses to save money in this area.

·The Energy Team will find potential donors for campus energy projects and submit grants to procure funding. Thinking green can be a good investment in the long run.

·The team will also look into marketing of emission credits as a way to meet the cost of green power projects.

Reduce Total and Per Capita Energy Consumption

If UAF continue the process of making better and more efficient use of their energy, they can save a lot. But only by raising the level of awareness and the knowledge between people on campus can they make a big change.

Increase Energy Efficiency

UAF will aggressively pursue low cost, high return energy efficiency upgrades, while investing in renewable energy and continuing to promote energy education for all campus constituents. To accomplish this, the Energy Team will:

·Plan energy conservation measures

·Review plans for new construction to ensure energy-efficiency measures meet campus goals

·Investigate and employ new renewable or energy-efficient technologies

·Provide information about our energy use and its global environmental impact to campus constituents

·Recommend the purchase of renewable energy sources where these resources prove cost-effective

Reduce Energy Consumption

·Launch an energy education and awareness campaign

·Hold a Campus Environmental Footprint seminar for all in-coming students.

·Increase involvement and collaboration with ASUAF and Residence Advisors.

·Create a video describing various ways to save energy on campus to run before selected campus events and in the residence halls.

·Begin an environmental/energy column in the campus newspaper.

·Increase efforts to involve students in looking for energy solutions on campus.

·Provide only CFL lights to students in the residence halls.

·Hold a year-long energy-saving competition on campus.

Have two divisions: Most Energy-Efficient Office Building and Most Energy-Efficient Dorm. Give significant rewards for the buildings that have the greatest reduction in electricity use per occupant and/or per square foot.

·Launch a campaign to turn off lights and computers when not in use.

According to an analysis by the energy officer at Colorado University at Boulder, just getting computer users to enable the energy saving sleep mode on their computer monitors could save the campus up to $450,000/year, while also reducing annual emissions of greenhouse gases by 3500 tons of carbon dioxide. The study also found that stickers such as "When Not In Use, Turn Off the Juice" or "Do a Little, Save a Watt" were effective in encouraging people to turn off the lights and to put computers to sleep. It found "significantly more compliance" in rooms that had stickers on the light switches and computers compared to rooms without stickers.

References

E-mails and class notes from the presentation made by the Facility Services

E-mail and meeting with Chilkoot Ward , Manager at the UAF Power Plant

Material kindly sent to me by Professor Todd

http://www.uaf.edu/fs/utilities.html

http://www.middlebury.edu/administration/enviro/initiatives/

http://www.cmu.edu/greenpractices/green_initiatives/index.html

http://www.warren-wilson.edu/environmental/initiatives.php

http://www.energystar.gov

http://www.cfs.psu.edu/

http://sustainability.ucsc.edu/

Appendix A. American College & University Presidents Climate Commitment

http://www.presidentsclimatecommitment.org/html/commitment.php

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

1) While we understand that there might be short-term challenges associated with this effort, we believe that there will be great short-, medium-, and long-term economic, health, social and environmental benefits, including achieving energy independence for the U.S. as quickly as possible.
2) We believe colleges and universities must exercise leadership in their communities and throughout society by modeling ways to minimize global warming emissions, and by providing the knowledge and the educated graduates to achieve climate neutrality. Campuses that address the climate challenge by reducing global warming emissions and by integrating sustainability into their curriculum will better serve their students and meet their social mandate to help create a thriving, ethical and civil society. These colleges and universities will be providing students with the knowledge and skills needed to address the critical, systemic challenges faced by the world in this new century and enable them to benefit from the economic opportunities that will arise as a result of solutions they develop.
3) We further believe that colleges and universities that exert leadership in addressing climate change will stabilize and reduce their long-term energy costs, attract excellent students and faculty, attract new sources of funding, and increase the support of alumni and local communities. **Accordingly, we commit our institutions to taking the following steps in pursuit of climate neutrality:**
4) 1. Initiate the development of a comprehensive plan to achieve climate neutrality as soon as possible.
5) a. Within two months of signing this document, create institutional structures to guide the development and implementation of the plan.
6) b. Within one year of signing this document, complete a comprehensive inventory of all greenhouse gas emissions (including emissions from electricity, heating, commuting, and air travel) and update the inventory every other year thereafter.
7) c. Within two years of signing this document, develop an institutional action plan for becoming climate neutral, which will include:
8) i. A target date for achieving climate neutrality as soon as possible.
9) ii. Interim targets for goals and actions that will lead to climate neutrality.
10) iii. Actions to make climate neutrality and sustainability a part of the curriculum and other educational experience for all students.

11) iv. Actions to expand research or other efforts necessary to achieve climate neutrality.
12) v. Mechanisms for tracking progress on goals and actions.
13) 2. Initiate two or more of the following tangible actions to reduce greenhouse gases while the more comprehensive plan is being developed.
14) a. Establish a policy that all new campus construction will be built to at least the U.S. Green Building Council's LEED Silver standard or equivalent.
15) b. Adopt an energy-efficient appliance purchasing policy requiring purchase of ENERGY STAR certified products in all areas for which such ratings exist.
16) c. Establish a policy of offsetting all greenhouse gas emissions generated by air travel paid for by our institution.
17) d. Encourage use of and provide access to public transportation for all faculty, staff, students and visitors at our institution
18) e. Within one year of signing this document, begin purchasing or producing at least 15% of our institution's electricity consumption from renewable sources.
19) f. Establish a policy or a committee that supports climate and sustainability shareholder proposals at companies where our institution's endowment is invested.
20) g. Participate in the Waste Minimization component of the national RecycleMania competition, and adopt 3 or more associated measures to reduce waste.
21) 3. Make the action plan, inventory, and periodic progress reports publicly available by providing them to the Association for the Advancement of Sustainability in Higher Education (AASHE) for posting and dissemination.
22) In recognition of the need to build support for this effort among college and university administrations across America, we will encourage other presidents to join this effort and become signatories to this commitment.
23) Signed,
24) ***The Signatories of the American College & University Presidents Climate Commitment***

Appendix B. The Talloires Declaration

http://www.ulsf.org/programs_talloires.html

(pronounced Tal-Whar)

We, the presidents, rectors, and vice chancellors of universities from all regions of the world are deeply concerned about the unprecedented scale and speed of environmental pollution and degradation, and the depletion of natural resources.

Local, regional, and global air and water pollution; accumulation and distribution of toxic wastes; destruction and depletion of forests, soil, and water; depletion of the ozone layer and emission of "green house" gases threaten the survival of humans and thousands of other living species, the integrity of the earth and its biodiversity, the security of nations, and the heritage of future generations. These environmental changes are caused by inequitable and unsustainable production and consumption patterns that aggravate poverty in many regions of the world.

We believe that urgent actions are needed to address these fundamental problems and reverse the trends. Stabilization of human population, adoption of environmentally sound industrial and agricultural technologies, reforestation, and ecological restoration are crucial elements in creating an equitable and sustainable future for all humankind in harmony with nature.

Universities have a major role in the education, research, policy formation, and information exchange necessary to make these goals possible. Thus, university leaders must initiate and support mobilization of internal and external resources so that their institutions respond to this urgent challenge.

We, therefore, agree to take the following actions:

1. **Increase Awareness of Environmentally Sustainable Development**
   Use every opportunity to raise public, government, industry, foundation, and university awareness by openly addressing the urgent need to move toward an environmentally sustainable future.
2. **Create an Institutional Culture of Sustainability**
   Encourage all universities to engage in education, research, policy formation, and information exchange on

population, environment, and development to move toward global sustainability.

3. **Educate for Environmentally Responsible Citizenship**
   Establish programs to produce expertise in environmental management, sustainable economic development, population, and related fields to ensure that all university graduates are environmentally literate and have the awareness and understanding to be ecologically responsible citizens.
4. **Foster Environmental Literacy For All** Create programs to develop the capability of university faculty to teach environmental literacy to all undergraduate, graduate, and professional students.
5. **Practice Institutional Ecology**
   Set an example of environmental responsibility by establishing institutional ecology policies and practices of resource conservation, recycling, waste reduction, and environmentally sound operations.
6. **Involve All Stakeholders**
   Encourage involvement of government, foundations, and industry in supporting interdisciplinary research, education, policy formation, and information exchange in environmentally sustainable development. Expand work with community and nongovernmental organizations to assist in finding solutions to environmental problems.
7. **Collaborate for Interdisciplinary Approaches**
   Convene university faculty and administrators with environmental practitioners to develop interdisciplinary approaches to curricula, research initiatives, operations, and outreach activities that support an environmentally sustainable future.
8. **Enhance Capacity of Primary and Secondary Schools**
   Establish partnerships with primary and secondary schools to help develop the capacity for interdisciplinary teaching about population, environment, and sustainable development.
9. **Broaden Service and Outreach Nationally and Internationally**
   Work with national and international organizations to promote a worldwide university effort toward a sustainable future.
10. **Maintain the Movement**
    Establish a Secretariat and a steering committee to continue this momentum, and to inform and support each other's efforts in carrying out this declaration.
11.

Creators and Original Signatories

Jean Mayer, President *Tufts University, U.S.A.* (Conference Convener)
Pablo Arce, Vice Chancellor *Universidad Autonoma de Centro America, Costa Rica*
L. Ayo Banjo, Vice Chancellor *University of Ibadan, Nigeria*
Boonrod Binson, Chancellor *Chulalongkorn University, Thailand*
Robert W. Charlton, Vice Chancellor & Principal *University of Witwatersrand, South Africa*
Constantine W. Curris, President *University of Northern Iowa, U.S.A.*
Michele Gendreau-Massaloux, Rector *l'Academie de Paris, France*
Mario Ojeda Gomez, President *Colegio de Mexico, Mexico*
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Stuart Saunders, Vice Chancellor & Principal *University of Cape Town, South Africa*
Akilagpa Sawyerr, Vice Chancellor *University of Ghana, Ghana*
Carlos Vogt, President *Universidade Estadual de Campinas, Brazil*
David Ward, Vice Chancellor *University of Wisconsin-Madison, U.S.A.*
Xide Xie, President Emeritus *Fudan University, People's Republic of China*

3. Transportation

Malin Aronsson and Nick Toye

Natural Resource Management Planning, NRM 430
Spring 2008

Introduction

In an effort to reduce the dependence on fossil fuels for transportation, reliance from personal vehicles is being replaced with alternate transportation methods such as public transit, cycling, walking, and carpooling. Cities and universities around the world are doing whatever possible to shift to sustainable transportation methods in an effort to reduce the amount of greenhouse gasses emitted to the atmosphere while conserving our non-renewable resources. By increasing the efficiency of the existing UAF vehicle fleet including all shuttles and UAF affiliated vehicles, UAF will be doing its part to promote sustainability in the North. This is also done by promoting alternative transportation system and non-motorized alternatives. UAF has already taken steps to accomplish this, but much more needs to be done.

Current Practices

Carpool System

UAF has recently developed a carpool program that is attempting to invite more people to work together to reduce the amount of emissions on campus as well as avoid traffic congestion on campus. Currently there are 8 rides listed that are willing to drive people to school. This number can be increased by providing incentives for carpooling on campus.

Hybrid Vehicles

Facilities Services currently uses 5 hybrid vehicles to reduce emissions and consumption of fossil fuels. This fleet should be increased to show a true commitment to sustainability for the campus. Alternative fuel campus shuttles should also be used during warm weather conditions. Alternative fuel vehicles include all hybrid, ethanol, bio-diesel, electric, solar, or human-powered technology that replaces the need for fossil fuel consumption.

Trails

Extensive campus trails can get pedestrians anywhere they want to go on campus. Historic trails dating back to 1923 can be utilized along with the addition of many new trails in recent years. We have a great trail system and we can do more to encourage people to use them.

Pedestrian Paths

The UAF Draft Sustainability Report[1] points out that walking, biking, and skiing are currently the best ways to reduce vehicle emissions on campus

Paved walkways throughout campus allow pedestrians to easily pass from buildings as well as from lower campus to the West Ridge. Pedestrian traffic signs are visible to drivers at crosswalks to maintain safe walking conditions. Facilities Services maintains the sidewalks by shoveling snow and adding gravel when sidewalks are icy.

Although adequate for low traffic situations, sidewalks must be improved to accommodate an increasing number of users. If pedestrian traffic is going to be promoted, it must also be made convenient for a growing population.

[1] UAF Facilities Services, March 2007.

Bicycle paths can also be found on campus; however there are some areas that are in need of improved bike accessibility. For example, Yukon Drive is the main road that connects Upper and Lower campus. A narrow sidewalk exists on the north side of the road but there is no designated path for bikers. Dangerous situations occur as cars and bikers are forced to share the road that is not designed with wide shoulders. Potential exists on the south side of Yukon drive to implement a new bike path for bicycle transportation.

Bike Racks and Lockers

Many people bike to campus year-round and there are bike racks near almost every building. Bicycle lockers are available in two locations: West Ridge near the International Arctic Research Center, and on the east side of the Gruening Building. Bike racks, as well as new bike lockers, are a valuable asset to our campus.

One area of improvement for the existing bike racks would be to construct a roof system over the main bike racks. Sheltered bike racks over the Constitution Park bike racks would make bicycling more convenient for everyone on campus.

Promoting the bike as a clean and efficient alternative to the personal automobile is a practical way for cities to reduce traffic congestion and smog. To simultaneously confront those problems as well as climate change and an emerging obesity epidemic, government leaders and advocacy groups are working to bring cycling back to prominence in the urban transport mix.

A number of European cities have set the standard for bicycle use and promotion, via pro-bike transportation and land use policies, as well as heavy funding for bicycle infrastructure and public education. In Copenhagen, for example, 36 percent of commuters bike to work...

Bikes as indicators
BICYCLES PEDALING INTO THE SPOTLIGHT
http://www.earthpolicy.org/Indicators/Bike/2008.htm

by J. Matthew Roney
http://www.earthpolicy.org/Indicators/Bike/2008.htm

Adequate Parking Availability

Parking is currently sufficient on campus. Taku and Nenana are the largest parking lots on campus. Both lots are close enough to walk to main campus or use the shuttles. Although adequate, improvements can be made. Further attempts should be made to increase parking availability around the perimeter of campus while reducing parking in the interior to ensure a pedestrian friendly campus.

Parking decal sales for 2006-2007 include 5137 student passes and 2117 faculty passes. Year totals include all full-time, part-time, and gold decals for fall, spring and summer semesters of school. Faculty totals come from all annual, fall/spring, summer and gold decals sold. These numbers are predicted to increase and as they do, so will the harmful emissions as well as traffic congestion. Alternative ride programs should be instilled into campus culture.

Shuttle System

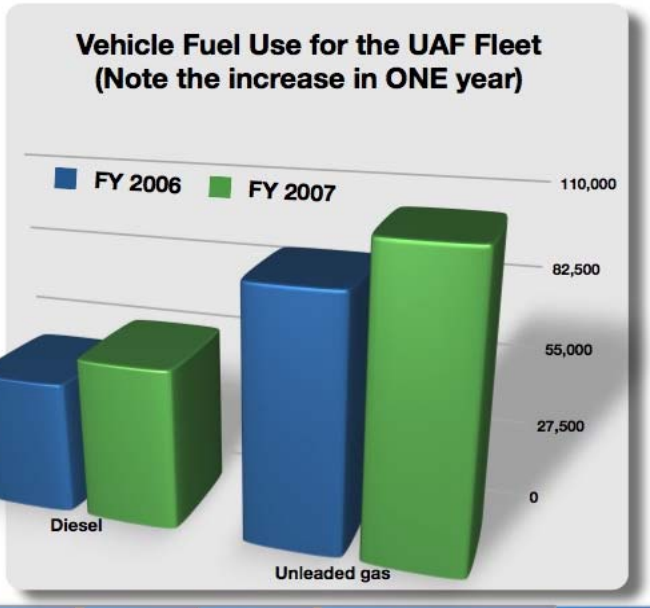
Campus shuttles provide free rides for students, faculty, staff and visitors. Campus shuttles reduce the amount of car traffic which improves air quality and promotes a pedestrian-friendly campus. The shuttles currently run on diesel fuel, which enables the vehicles to travel 30% farther than the same amount of gasoline.

Information provided by Facility Services and bus drivers indicated that each bus averages between 12-15 mpg and they expect to use about 1 gallon of diesel per hour of use. We reviewed all bus routes for a

weekday and recorded 70 total hours of shuttle use. This indicates that 70 gallons of fuel are used on a typical weekday during fall and spring semesters.

Fuel Use at UAF

We were able to obtain data on the past two years of fuel use from the Facilities Services Warehouse. This shows that gasoline use increased 18% and diesel increase 21% between 2006 and 2007. If this were to continue, gasoline consumption would double in 3.9 years and diesel fuel consumption would double in just 3.3 years[2].



	FY 2006	FY 2007	CHANGE 2006 to 2007		Doubling Time
	Gallons		Gallons	%	if this rate continues
Unleaded Gas	86,734	102,707	15,973	+ 18%	3.9 yrs
Diesel (vehicles)	45,915	55,548	9,633	+ 21%	3.3 yrs

1.1.1. [2] Source: Personal communication, Tom Robinson, Manager, UAF Facilities Services Warehouse, March 7, 2008. This includes only the fuel obtained at the UAF Facilities Services filling station.

CO2 Emissions from the Vehicle Fuel Used in 2007

	FY 2007	CO2 emitted (pounds/gallon)*	CO2 emitted (pounds)	CO2 emitted (tons)
Gas	102,707	19.4	1,992,516	996
Diesel	55,548	22.2	1,233,166	617
		Total CO2 emitted =	**3,225,681**	**1,613**

***Source:** http://www.epa.gov/OMS/climate/420f05001.htm

We must address the reasons for this substantial increase in fuel consumption on campus. In following of the recommendations of this document, we can significantly reduce the amount of fuel consumed.

PROPOSED SUSTAINABLE TRANSPORTATION

Vision Statement

University of Alaska Fairbanks will contribute to a sustainable environment by providing sustainable transportation systems for students, faculty members and staff. In this work, UAF will provide an example for all northern universities.

UAF will increase fuel efficiency, reduce emissions and attempt to have no net carbon emissions from the transportation system. This will contribute to better air quality by reducing emissions. This will also improve the health of the people connected to the university by promoting a pedestrian and bike friendly environment and reduce the numbers of cars used on campus.

Goals and Objectives:

University of Alaska Fairbanks will provide a sustainable transportation system to increase fuel efficiency, reduce emissions and improve air quality.

Objectives:

Set an example of how local air quality can be improved by reducing vehicle emissions.

Maximize the energy efficiency of the UAF Vehicle fleet

Reduce the total amount of fossil fuel consumed by University vehicles by half, by 2015

Work to double the fuel efficiency of all UAF vehicles by 2020.

Increase availabilities for UAF vehicles to use alternative fuel systems.

Create a task force for researching a more efficient shuttle system.

Work for a transition to vehicles running on alternative fuels for University vehicles.

University of Alaska Fairbanks will create pedestrian and bike friendly campus that encourages alternative transportation methods.

Objectives:

Promote alternative transportation methods at UAF during all seasons to reduce emission and increase health.

Make UAF friendlier for non-motorized transportation methods by increasing and improving walking/biking paths and opportunities.

Increase safety for pedestrians and bikers all over campus.

Increase the possibilities for students, faculty and staff to use non motorized transportation to and from *UAF*.

Support the campus based bike program.

University of Alaska Fairbanks will work for reducing the numbers of cars used on campus and work to encourage and increase trip reduction strategies.

Objectives:

Reduce dependence on personal vehicles.

Promote a campus-wide carpooling program and provide insensitive for people taking part in the system.

Create a parking plan with the aim to move all parking to the border of campus, construct parking garages and work to facilitate both short and long term parking.

Support the Downtown Association's plan to construct a trolley system.

Increase the opportunities for students, faculty and staff to use alternative transportation systems to and from UAF.

University of Alaska Fairbanks will work on strategies to reduce traveling to and from the university by providing alternatives.

Create a task force that will look into the needs for more housing on campus and encourage others to build higher density housing nearby.

UAF will create and encourage trip reduction strategies.

UAF will use less transportation and emission as an incentive for students to choose to live on campus.

Goals and Actions

University of Alaska Fairbanks will provide a sustainable transportation system to increase fuel efficiency, reduce emissions and improve air quality.

Actions:

UAF will quantify the amount of carbon emission currently released to the atmosphere from all fossil fuel combustion from the university.

Create a task force that will work on different strategies and goals for how UAF can contribute to the work of improving the air quality in the Fairbanks North Star Borough.

Set interim efficiency targets for 2010 and 2015 so that fuel efficiency is doubled by 2020.

Set goals for minimum fuel efficiency for all vehicles used at UAF, all new purchased vehicles must follow that minimum.

Start a workgroup that looks into the possibilities for an alternative fuelling station at UAF. Such a fuel station would give UAF an opportunity to do research and provide an example on how this can be done despite our cold temperatures and remote location.

Start a work group with members representing students, facility service, faculty, staff and others affected that will look into how the shuttle bus system can be improved. They will mainly focus on how the routes can be changed to minimize the distance the buses travel empty. They will also try to reduce to number of shuttle buses or number of trips. The group will consider changing the time table and decreasing the number of trips, one solution is to have shuttle buses run only at the beginning and end of classes.

Implement the improvements for the Campus Shuttle Bus System proposed by the task force, if any.

Work for implementing bio-fuel shuttles during warm weather condition, start with a “green” route during the summer.

Reduce daily total hours of operation by campus shuttles.

University of Alaska Fairbanks will create pedestrian and bike friendly campus that encourages alternative transportation methods.

Actions:

Change the schedule to have 20 minutes as the shortest break between classes to give students a chance to walk between the different areas without running and to bike safely.

Improve the existing biking and walking paths on campus.

Increase the number of walking and biking paths one campus. Every road will have sidewalks and separate bike path on both sides.

Build bike racks with roofs or roofs/walls by every building on campus where people live, work or where classes are held. Increase the number of bike lockers. This to create weather-protected and safe places to store bikes and to show that UAF is willing to support more biking on campus.

Improve safety for pedestrians and bikers by separating biking and walking paths from each other and the streets. This can be done by constructing different paths or by dividing the existing ones in a clear way. If there will be a dividing one the existing paths they need to be wider to make it safe for bikers and pedestrians to meet.

Improve safety by provide lighting on all campus paved pedestrian paths sidewalks.

Require cars to yield to pedestrians and bicycles on campus. !

Create large maps and information signs evenly spread over campus to show the new and improved trail/path system and encourage people to walk or bike (or ski in the winter time).

Connect the walk and bike paths at campus to the paths around and in Fairbanks to make it easy and safe for people to bike/walk back en forth to UAF.

Close Yukon Drive to all but the shuttle bus and essential delivery vehicles.

Widen sidewalks or create an additional path along Yukon Dr. to keep bikers, runners, walkers, and skiers off the street.

Complete Tanana Loop including paths or sidewalks on both sides and a way for skiers to cross over it or go under it.

Support the student-initiated bike program started by members of the Sustainable Campus Task Force, SCTF so that people can share bikes on campus.

Carry out a survey to find out what kind of transportation system people connected to UAF use on campus and to get to campus. This survey will show the current situation and where effort needs to be put. The test survey carried out during the Sustainable Campus open house in Wood Center, March 27 2008 can be used as a starting point. (See attachment 1 for results and attachment 4 for summary of current situation).

University of Alaska Fairbanks will work for reducing the numbers of cars used on campus and work to encourage and increase trip reduction strategies.

Actions:

Change the schedule to have 20 minutes as the shortest break between classes to give students a chance to walk between the different areas without running and to bike safely.

Provide incentives for students, faculty and staff to use the current UAF Carpool Network

Provide information and opportunity to sign up for carpooling every time someone purchases a parking permit.

Parking services gives information about carpooling during the introduction of new students.

Offer reduced parking fees for carpool vehicles and/or Allocate special parking locations for carpool vehicles. These could be in place of current Gold Decal locations.

Have designated perking areas for carpooling at more attractive spots that the rest of the parking area.

Have 1/3 of all the people with every day connection to UAF sign up for the carpooling system.

Consider giving a reward to those who do not use cars to commute to school.

Give a separate reward for driving a vehicle that gets over 45 (or other) mpg. Alaska Biological Research (ABR, Inc.) does this, and the employees are very fond of the program.

Start a task force that will create a plan for how to move all parking to the border of campus. For this the master plan for 2002 can be used or a new plan can be created.

Set a preferred maximum limit for parking space.

Start to decrease parking on campus and increase parking on the border of campus according to the plan made for goal 3.1. (Handicapped parking can still exist on campus to ease for people with disabilities).

Construct parking garages according to the plan made for goal 3.1.

Make designated areas for long term and short term parking with the short term closest to campus to facilitate for commuting students.

Convert the parking space on campus to green areas.

Work to get UAF included in the Trolley system network included in the Fairbanks Downtown Plan, it is expected to run from the Airport to downtown and the planners state that “if there is interest” they would like to have it go to UAF as part of a loop system. Grants are available for such public transit systems.

Create a community outreach shuttle system that caters to students who live in the neighboring areas of campus. The following areas of high density should be included: Ester, Sheep Creek, Goldstream Valley and Ballaine Rd. The system could run just during peak periods.

Carry out a survey to find out what kind of transportation system people connected to UAF use on campus and to get to campus. This survey will show the current situation and where effort needs to be

put. The test survey carried out during the Sustainable Campus open house in Wood Center, March 27 2008 can be used as a starting point. (See attachment 3 for results and attachment 4 for summary of current situation).

Reduce Air Travel UAF will work to providing nearby housing opportunities for students, faculty and staff to reduce transportation.

Actions:

A task force will be put together to find new suitable areas for building more housing for students, faculty and staff

University of Alaska Fairbanks will work on strategies to reduce traveling to and from the university by providing alternatives.

The quality of teleconferencing has increased dramatically over the past few years. Increasingly, it is an effective way to reduce number of flights the staff, faculty and administration must take. UAF will encourage teleconferencing in lieu of traveling.

Air travel is estimated to account for 2% of global CO2, but those releases have two to four times the impact given their release at high altitudes. Aircraft use an incredible amount of fuel and they burn it high up in the sky where the air is thin and the chemistry is complex and fragile. The overall impact is a warming effect that is 1.9 times that of carbon dioxide alone.[3] UAF will encourage not traveling by air if possible. This can be done by a contest to see which department on campus can reduce their total air miles the most.

There will be information about the goal of reducing emissions caused by traffic on and to campus on UAF webpage. That information will include information about living on campus to reduce car traffic to and from UAF. This information will also be available for future student; it can be used as a reason for choosing UAF, the sustainable university.

Comment [ST1]: Require that all flights be compensated for by purchasing carbon offsets. http://www.nativeenergy.com/pages/organizations/5.php is one well-respected way to purchase credits. The Gold Standard reviews and investigates marketers of carbon credits to ensure reliability. http://cdmgoldstandard.org/about_goldstandard.php

MIGHT ADD SOMETHING ABOUT BIKES AS INDICATORS:

Promoting the bike as a clean and efficient alternative to the personal automobile is a practical way for cities to reduce traffic congestion and smog. To simultaneously confront those problems as well as climate change and an emerging obesity epidemic, government leaders and advocacy groups are working to bring cycling back to prominence in the urban transport mix.

A number of European cities have set the standard for bicycle use and promotion, via pro-bike transportation and land use policies, as well as heavy funding for bicycle infrastructure and public education. In Copenhagen, for example, 36 percent of commuters bike to work...

For entire text see http://www.earthpolicy.org/Indicators/Bike/2008.htm

[3] http://www.climatechangeconnection.org/Solutions/Airtravel.htm

4. Built Environment

Incorporating green building standards throughout the design and construction of all new construction and remodeling projects at the University of Alaska, Fairbanks will help build an ecologically sustainable campus. Green building standards are simply good engineering and design. Together we can work towards a better university; green building is just one important step.

Mission Statement

To transform the development, design, construction, renovation, and maintenance[4] of the built environment at the University of Alaska Fairbanks into a sustainable process which conserves energy, water, and resources.

Current Situation

The premise behind "green" building design is simple: create buildings that take less from the earth and give more to people.[5] Green buildings are cheaper to operate and healthier, more pleasant places to work.

The Fairbanks campus currently only houses one building that meets green building standards. The Cold Climate Housing Research Center was built following sustainable building standards and is pending LEED Certification. As a non-profit corporation it is only affiliated with and does not belong to the University. The Bioscience Facility is the next building expected to be constructed in Fairbanks. Its preliminary design follows sustainable building guidelines and is expected to meet LEED Silver standards; however, the project has yet to receive construction funding.

Some of the characteristics of sustainable building materials include the following:[6]

- Manufactured or harvested close to point of final use
- Made from renewable and sustainably-harvested materials
- Energy and water-efficient to produce and use
- Minimal air or water pollution produced in their manufacture
- Non-toxic
- Durable
- Recycled and recyclable whenever possible

The Leadership in Energy and Environmental Design (LEED) green building rating system, established in 1994, provides a framework of design standards for assessing building performance through a variety of environmental indicators. The LEED rating system addresses six major areas:[7]

- Sustainable Sites
- Water Efficiency
- Energy and Atmosphere
- Materials and Resources
- Indoor Environmental Quality
- Innovation and Design Process

[4] UC Santa Barbara Draft Campus Sustainability Plan, May 2007
[5] Penn State Green Destiny Council, Indicators Report: Steps toward a Sustainable University. 2000.
[6] Energy Star, www.energystar.gov
[7] USGBC LEED Standards: www.usgbc.org/leed

The *2008 College Sustainability Report Card*[8] released by the Sustainable Endowment Institute gave the University of Alaska (UA) System a C-. Schools across the US and Canada with the 200 largest endowments were graded in eight categories. In the green building category, UAF received a C. We must strive for a sustainable built environment and a higher grade.

Goals

Sustainability is a long term vision accomplished through short term goals. Implementation of these goals will place the University on a path towards sustainability.

Goal I

Utilize efficient and sustainable building standards on new construction, renovation, and maintenance projects.

Goal 2

Building Decision-Making Process: Foster a University community that is concerned with the long term sustainability of the built environment by encouraging University community participation in decision making and maximizing the use of local talents prior to looking for outside assistance.

Goal 3

In the spirit of transparency, make information easily available about the built environment of the Fairbanks campus.

Goal I

Utilize efficient and sustainable building standards on new construction, renovation, and maintenance projects.

Steps toward Accomplishment:

i. Renovate and construct UAF facilities with the goal of achieving the equivalent of a LEED Silver or higher rating.
ii. Study current sustainable building standards (LEED, Energy Star, ASHRAE[9]) and develop a sustainable building code for UAF adapted to the conditions in Fairbanks.
iii. Monitor the progression of sustainable building standards and adapt best practices as they develop.

Goal 2

Building Decision-Making Process: Foster a University community that is concerned with the long term sustainability of the built environment by encouraging University community participation in decision making and maximizing the use of local talents prior to looking for outside assistance.

Steps toward Accomplishment:

i. Recruit one student from each level (freshman, sophomore, junior, senior, and graduate) to participate in committees and working groups that deal with the built environment, including the Master Planning Committee, the Chancellor's Board of Directors, and their various subcommittees.

[8] Sustainable Endowment Institute: http://www.endowmentinstitute.org/sustainability/
[9] LEED: www.usgbc.org/leed, Energy Star: www.energystar.gov, ASHRAE: http://www.ashrae.org/

ii. Advertise the Master Planning Committee and Chancellor's Board of Director's meetings and encourage attendance from the University community. Encourage attendees to comment and provide input and ideas.
iii. Consult with the Cold Climate Housing Research Center, the UAF College of Engineering and Mines, the TVC Construction Management Program, and other campus resources in planning built environment projects.
iv. Provide paid internships and internships for credit with Facilities Services.
v. Require contractors in engineering, consulting, and construction to offer either paid internships and/or internships for credit to ensure student participation.

Goal 3

In the spirit of transparency, make information easily available about the built environment of the Fairbanks campus.

Steps toward Accomplishment:

i. Host a website dedicated to the dissemination of information related to campus sustainability. Suggestions for the web address include www.uaf.edu/sustainability and www.uaf.edu/green.
ii. Publish an annual report on campus structures: buildings, parking lots, sidewalks, and roads, looking at the campus as a whole and the individual structures. The statistic and figures included should be: types of structure, numbers of structures, square footage, monetary value, human usage, research usage, costs of operation and maintenance, and energy and water consumption.
iii. Publish an annual report detailing current construction projects and those in the pipeline. With each construction project, detail why sustainable building standards were or were not followed and how those decisions were made.

5. Waste Management

Drafted by: Eli Sonafrank, Ron Norman, and Larsen Hess

Introduction:

> *Our enormously productive economy demands that we make consumption our way of life, that we convert the buying and use of goods into rituals, that we seek our spiritual satisfaction, our ego satisfaction, in consumption. We need things consumed, burned up, worn out, replaced and discarded at an ever-increasing rate.*
>
> - Victor Lebow, Advertising Executive, 1950[1]

Mr. Lebow was prescient; since 1950, the world's people have consumed more goods than all previous generations combined[2]. Nationwide, we are running out of places to dump our trash and the quantity of toxic materials continues to increase in the soil, the water and the air.

In contrast to our wasteful system, nature works in cycles. In the natural world, "waste equals food"—the waste of one organism becomes food for another. Nothing is "discarded." This is a zero waste system. In such a system, all wastes are viewed as feedstock for another useful product. A zero waste strategy means that if we cannot reuse, recycle, compost, or incinerate an item for energy—we shouldn't buy it in the first place.

A realistic but firm commitment by UAF to reduce and divert its waste stream will demonstrate how human systems can emulate natural systems to produce "zero waste." This can be accomplished by reducing the amount of wasteful consumption at UAF, while increasing the proportion of reuse and recycling.

Current Status

ASUAF Recycling[3] (UAF's student funded/run recycling program)*

- Aluminum (approximately 1 ton per year)
- Printer Cartridges
- Grocery Bags
- Packing Materials
- Being Considered for addition: Plastics #1 & #2, Composting
- Participating in the formation of a Borough wide recycling program

[1] Quoted in Michael F. Jacobson and Laurie Ann Mazur, *Marketing Madness: A Survival Guide for a Consumer Society* (Boulder, Colorado: Westview Press, 1995), p. 191, note 18 (attributing quote to *The Journal of Retailing*, Spring, 1955, p. 7).
[2] Alan Durning. 1992. *How Much is Enough? The Consumer Society and the Future of the Earth.* W. W. Norton.
[3] Associated Students of the University of Alaska Fairbanks, Recycling Department. Available Online. http://asuaf.org/recycle
[4] University of Alaska Fairbanks, Facilities Services. Available Online. http://www.uaf.edu/fs/

UAF Facilities Services[4]

- Surplus office supplies/equipment**
- Mixed paper recycling infrastructure (temporarily inactive)
  - Blue waste bins
  - Green dumpsters
- Regular waste removal service (2,160,000 lbs in 2007)***
  - Normal waste bins
  - Brown dumpsters
- Environmental Health and Safety/Hazardous Materials (processed 91,464 lbs in 2007)
  - Waste battery recycling
  - Safe disposal of fluorescent light bulbs
  - Safe disposal of hazardous materials/chemicals
  - Recycling of electronics
- Sewer Waste is piped to Golden Heart Utilities where it is processed and the solids are composted.
- Landscaping organic waste composted at "Eco-dump"

*Facilities Services is in the preliminary stages of considering taking over the student run recycling program to make it a larger scale service also managed through the janitorial staff like the paper recycling program.

**"Surplus" as it's commonly know, is probably the largest diversion of the waste stream in terms of volume or mass, with the possible exception of the paper recycling program at it's peak. All functional office or lab equipment that is disposed of on campus goes to a warehouse on Aurora Dr. which has an enormous selection of everything from desk chairs to computers to lab equipment. Any UAF employee with the permission of a department supervisor can go there and pick out anything that they can use in their office for free. It is a huge source of savings for departments which utilize it.

***The regular waste removal service dumpsters are picked up and taken to the landfill by a UAF owned garbage truck on Mondays, Wednesdays and Fridays. The mixed paper recycling dumpsters are picked up by the same truck on Tuesdays and Thursdays and taken to the landfill. The landfill used to have a separate storage warehouse for mixed paper to be taken to Eielson, palletized and burned as a supplement to coal in their power plant. However due to a fire at the Eielson pelletizing facility the paper recycling program is temporarily inactive and the paper brought to the landfill facility is being landfilled with the regular solid waste.

Vision:

Create a zero waste campus by reducing and ultimately eliminating waste on campus.

This change can occur by encouraging conservation, providing incentives for reuse, more efficiently using paper, eliminating plastic bags, charging a deposit on cans, plastic and glass bottles, encouraging green chemistry, and increasing the amount of materials recycled. Toxic waste, disposable beverage containers, plastic bags, paper and food waste should be the top priorities for change.

Actions:

Action: Decrease the per capita amount of waste generated by the UAF Campus

Reduction of the per capita waste generated by the UAF Campus (source reduction) is the first priority for improvement of UAF's waste management. This is in essence reducing the amount of materials each person consumes which will eventually need to be disposed of. This includes not just materials that will be landfilled, but also materials that will be recycled, because recycling also takes energy. The more people consume, the harder it is to fill that need using recycled material stocks, and the more energy it takes to do so. For example if disposable dishware is replaced with reusable dishware, then that waste is no longer generated, and doesn't need to be landfilled or recycled. The material that would have been consumed in the manufacture of those disposable dishes will no longer draw down the stocks of raw or recycled materials. (see Figure 1 and Table 1 in Appendix B)

Target 1: Decrease the per capita waste generated by 5% from 2008 to 2010.

Target 2: Decrease the per capita waste generated by 25% from 2008 to 2020.

Target 3: Decrease the per capita waste generated by 40% from 2008 to 2030.

Target 4: Decrease the per capita waste generated by 65% from 2008 to 2050.

Action: Decrease the per capita amount of waste going to the landfill:

Sending waste to the landfill makes these materials unavailable for human or biotic use for hundreds or thousands of years. It also occupies valuable land, causes groundwater pollution, attracts wildlife, and produces methane (a potent greenhouse gas). It is expensive to maintain and decommission, and is a source of liability for our Borough government. UAF also has to pay a "tipping fee" on each ton of waste sent to the landfill, currently $59[3]. (see Figure 1 and Table 2 in Appendix B)

Target 1: Decrease the per capita amount of waste going to the landfill by 15% from 2008 to 2010.

Target 2: Decrease the per capita amount of waste going to the landfill by 50% from 2008 to 2020.

[3] Fairbanks North Star Borough, Department of Public Works, Solid Waste Division. Available Online. http://co.fairbanks.ak.us/SolidWaste/Default.htm

Target 3: Decrease the per capita amount of waste going to the landfill to less than or equal to the amount of waste recycled by 2030, achieving "zero *net* waste."

Target 4: Decrease the per capita amount of waste going to the landfill to zero by 2050, achieving "zero waste."

Action: Increase diversion of waste going to the landfill with the following priorities:

1. Source reduction
2. Reuse
3. Remanufacturing
4. Closed loop recycling and composting
5. Open loop recycling
6. Waste-to-Energy Incineration

The main objective of diverting waste from going to the landfill is to make it available for use in place of raw materials. To achieve this to the greatest effect it is important to prioritize the types of diversion based on how many times the material can be reused through this diversion, and how much raw

material it can therefore replace. With these priorities UAF will gradually increase the proportion of its waste which is put back into the resource stream. (see Figure 1 and Tables 3 and 5 in Appendix B)

Target 1: Increase the percentage of waste diverted from going to the landfill to 10% by 2010.

Target 2: Increase the percentage of waste diverted from going to the landfill to 50% by 2020.

Target 3: Decrease the amount of material going to the landfill to be less than or equal to the amount of material consumed from recycled sources by 2030, achieving zero net waste.

Target 4: Decrease the amount of waste going to the landfill to zero by 2050.

Action: Increase the recycled content of materials consumed by the campus community.

An increase in the rate of recycling requires that there be demand for products containing the recycled material. Giving priority to the use of recycled material over virgin raw materials both reduces the pressures on our natural resources and reduces the amount of waste that has to be landfilled. In order to be able to increase the proportion of UAF's waste which is recycled, UAF will help increase demand for recycled materials by purchasing goods with recycled content. (see Figure 1 and Table 4 in Appendix B)

Target 1: Increase the percentage of recycled content in materials consumed to 5% by 2010.

Target 2: Increase the percentage of recycled content in materials consumed to 15% by 2020.

Target 3: Increase the amount of recycled content in materials consumed to be greater than or equal to the amount of material going to the landfill by 2030, achieving zero net waste.

Target 4: All materials consumed come from renewable or recycled sources by 2050.

Action: Decrease the amount of hazardous waste produced by the campus community.

Even more costly to dispose of than the regular solid waste, is the hazardous wastes produced by UAF. Because UAF is part of the global community, environmental justice requires that UAF would not decrease its hazardous waste simply by moving its production to other regions of the world. Therefore this action needs to include hazardous waste produced elsewhere in the manufacture of goods used on campus (i.e. the hazardous waste generated in the production of UAF's computers, and chemicals used in laboratories on campus). The focus should be put on reducing toxic wastes that are not closed-loop recycled (ie. reduce use of bromated flame retardants before lead). With these considerations, UAF will decrease the amount of hazardous waste it causes to be produced using the following steps.

Target 1: Decrease production of toxic waste by 10% by 2010.

Target 2: Decrease production of toxic waste by 50% by 2020.

Target 2: Decrease production of non-closed-loop recyclable toxic waste to zero by 2030.

Target 2: Decrease production of all toxic waste to zero by 2050.

Action: Decrease consumption of disposable goods on campus:

A way to help achieve the targets for decreasing waste generated at UAF is to decrease the use of single use disposable goods on campus. This is also important for changing the mentality of the campus community from that of the "disposable society" to seeing resource use more in terms of "life-cycles." To accomplish this, UAF will decrease the consumption of disposable goods with the following steps.

Target 1: By 2010 institute a $.25 tax on all products sold in disposable containers on campus. The proceeds from this can fund the campus recycling program, and subsidize reusable containers.

Target 2: By 2015 transition the entire campus to a "bring your own mug" policy. Subsidized reusable mugs and bottles can be provided at a low but significant cost, in school spirited designs, and must be made of a recycled and recyclable material.

Action: Reduce virgin paper use on campus.

Paper is one of the most characteristic materials used on university and college campuses. UAF uses an incredible amount of paper, enough each year to make a stack almost 1½ miles high (see Appendix 1). Virgin paper (paper made without recycled content and bleached using chlorine) is also a very high impact material, both in terms of natural resource use and pollution. To reduce virgin paper consumption at UAF will reduce the amount of forest that needs to be logged, as well as the amount of dioxin and other pollutants that are released into the airsheds and watersheds around paper mills. Decreasing paper use will also save UAF some of the money spent in buying paper. There are several easy ways to create incentives for reducing paper use on campus. These can include charging per page (not per copy/side), changing campus computers to print on both sides and use smaller margins by default, and encouraging instructors to require work to be submitted double sided with smaller margins (as well as doing this themselves). UAF will therefore decrease its use of virgin paper to zero by 2030 using the following steps.

Target 1: Create incentives for paper use reduction by 2010.

Target 2: Reduce the per capita amount of virgin paper used on campus by 50% from 2010 to 2020

Target 3: Reduce the amount of virgin paper used on campus to be less than or equal to the amount of recycled paper used by 2030.

Target 4: Reduce virgin paper use on campus to zero by 2050.

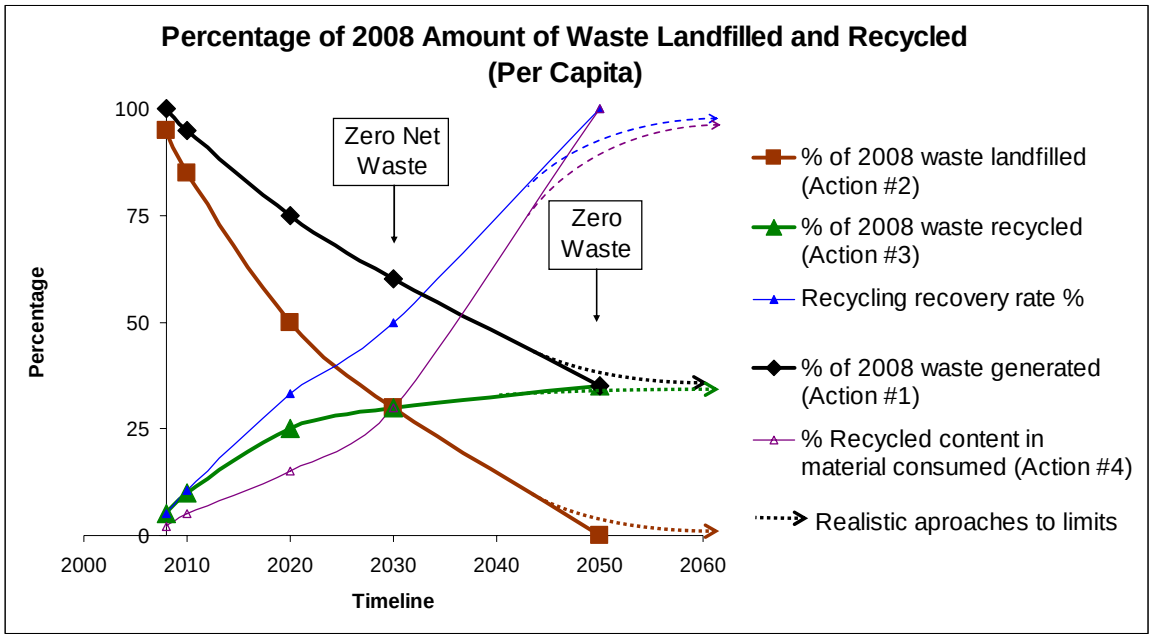


Figure 1: This Graph depicts the trends in waste management at UAF which would meet the goals of this plan. Here "waste recycled" is used as a general term to denote reuse, recycling, incineration for energy, or any other diversion from landfilling which makes use of the material for a purpose. The actual percentages of waste and recycling at which "Zero Net Waste" is reached in 2030 do not need to be precisely defined, so long

as they are equal or better. This allows the actual level of waste and recycling to be determined by the market costs of landfilling, recycling, and recycled content at the time. The same applies to the amount of waste recycled in 2050. Hypothetical percentages have been used for these values in this graph for the purpose of visualization. The "realistic approaches to limits" are also visualized here to convey the understanding that while the concrete goal of "Zero Waste" by 2050 is important, approaching it is a case of diminishing marginal returns. Achieving a state of zero waste may be possible, but approaching it may be increasingly challenging with decreasing marginal benefit. Likewise, there is a lot of waste reduction and recycling that can be achieved very soon at a low marginal cost.

Appendix A. Estimated Paper Consumption at UAF

	FY06 (sheets)	FY07 (sheets)	Change 07-06 (sheets)	Change 07-06 (%)
Dept Paper	6,955,000	7,040,000	85,000	1%
Copier Paper	7,713,761	8,977,522	1,263,761	16%
Total	14,668,761	16,017,522		

16,017,522	sheets per year from copiers & departments
7,040,000	add dept again, assuming UAF supplies HALF of total dept paper
23,057,522	sheets per YEAR
46,115	reams per year @ 500 sheets/ream
92,230	= # inches high this would be at 2" per ream
7,686	= # feet high PER YEAR
1.46	mile-high stack of paper every year
126	# reams per day (= reams per year ÷ 365 days/year)
253	= inches (at 2 in/ream)
21.1	= height in feet of paper used per day at UAF

Appendix B. Data for Figure 1.

Tables 1-5: These tables are the numbers used to generate the graph in Figure 1, based on the targets set in Actions 1-4. The numbers marked with * below are not specifically set by the goals but are hypothetical for the purposes of visualization of possible waste management trends. Here "recycled" is used as a general term to denote reuse, recycling, incineration for energy, or any other diversion from landfilling which makes use of the material for a purpose.

Action #1

Percent of 2008 Waste Generated	
Year	**%**
2008	100
2010	95
2020	75
2030	60*
2050	35*

Action #2

Percent of 2008 Waste Landfilled	
Year	**%**
2008	95
2010	85
2020	50
2030	30*
2050	0

Action #3

Percent of 2008 Waste Recycled	
Year	**%**
2008	5
2010	10
2020	25
2030	30*
2050	35*

Action #4

Percent of Recycled Content Consumed	
Year	**%**
2008	2
2010	5
2020	15
2030	30*
2050	100

Recycling Recovery Rate Percentage	
Year	**%**
2008	5
2010	11
2020	33
2030	50
2050	100

6. Food Services

Vision

Food is vital to us. At UAF food is treated with respect--respect for the land that produced it and the people that grew it. Hence, at UAF no food goes to waste. Leftovers are reduced to a minimum and finally composted. Food suppliers are chosen for their sustainable practices, relative proximity and efficient, energy saving distribution channels and networks. Funds are committed to explore new ways for growing food in the state of Alaska, using alternative sources of energy, to become self-sufficient in our food demand. Eating at UAF campus means eating responsibly and healthfully.

Mission

Large quantities of food are thrown away in the United States every day (EPA 2007, Kantor et al. 1997). With that, not only the food, that could have fed somebody, is lost. Also the energy that went into the primary production, the transportation, the packaging, and the preparation of the food is wasted. Our mission is to create awareness of the consequences of thoughtlessly dealing with food. We want everybody to think about their consumption and thereby reduce the amount of food wasted and at the same time enhance the health of students, staff and faculty. “Eat what you take, take what you need” should be the guideline for consumption that conserves our resources. Good

Food related waste occurs when disposable plates, flatware, containers, or napkins are used. This waste can amount to significant proportions of the total waste generated. We want to replace disposables with reusables and biodegradables to reduce the negative environmental effects.

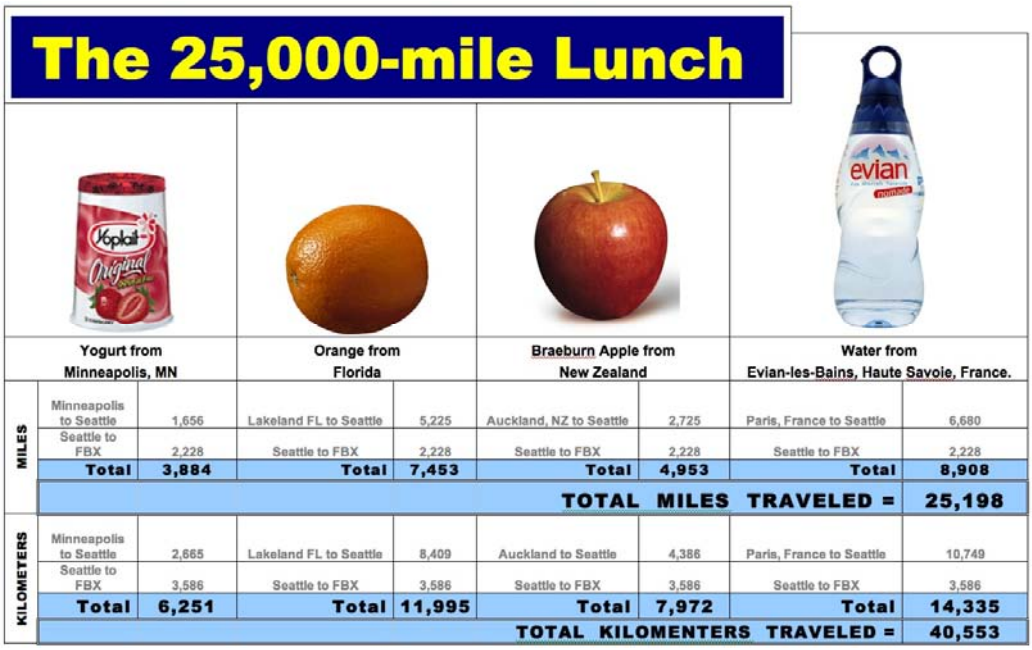
Alaska’s harsh environment is not well-suited for agriculture. Currently the state is not able to sustain its citizens’ demand for food. Greenhouses heated by geothermal energy, however, show promise and will possibly help to reduce the state’s expensive dependence on food imports. We want to make sure that consideration is given to new ways of producing local, organic food, and that funding is provided.

Current Situation

At the moment less than 1 percent of the food that is processed and consumed at UAF Campus was grown or farmed in Alaska (Linda Bahr, General Manager Dining Services, pers. comm.). A very short growing season is the main reason. Therefore, we rely heavily on food imports into the state.

Food purchasing policy – A low carbon diet

Very often food has to travel enormous distances to reach our plates. In fact, eighty percent of the energy that goes into production and supply of food comes from transportation and processing. The table below will gives an idea about the reason.



The example shows that since UAF is located in a relatively remote place in the globe, we should put even more thought into where our food comes from.

Food production itself accounts for seventeen percent of the US's C02 emissions. Research shows that we can significantly reduce our carbon footprint by reducing the consumption of meat and get closer to a vegan lifestyle. It is, however, not necessary to go to those extremes. The difference between two hamburgers per week and only won is already substantial. (Eshel and Martin, 2006).

A lack of suppliers and distribution networks restricts Dining Services' ability to serve organically grown food. Produce from organic or sustainable farming associations like Food Alliance are not available for our relatively remote campus.

Food waste

UAF Dining Services serves roughly 2,000 meals and accumulates 310 gallons of food waste per day (Linda Bahr, General Manager Dining Services, pers. comm.). Waste includes clippings during preparation, excess production, food related waste and *plate waste*. Plate waste, food that was taken but not finished, accounts for the greatest part. Roughly calculated this adds up to 124 tonnes per year[10]. Put simply, it takes only three days to produce one ton of food waste. Plate waste is, however, also the factor that shows the greatest potential for reduction. In contrast to preparation clippings and excess production, there is absolutely no reason to produce plate waste. By simply changing the attitude toward food, plate waste could be eliminated without any additional costs. It is also likely that this would result in lower waste quantities of the other factors as they are all related to the total production of food.

Composting

Since there are no composting facilities of sufficient size in the city area, the total quantity of food waste goes to a landfill. Currently, other waste utilization options, like food donations or feeding livestock, are not

[10] 310 galleons x 200 days x 2kg/galleon of waste = 124,000 kg

available or not being considered. One readily available option for utilization of food related waste is giving coffee grounds to gardeners. Coffee grounds make excellent compost and could be easily collected and placed at people's disposal.

Potential remedies

The potential of simply policies to reduce waste was shown recently. In an effort to reduce plate waste, Dining Facilities removed all trays from the commons area for one week. Their assumption was that food waste would be reduced when students only fill one plate with food instead of one tray. Hence, students were not able anymore to fill a tray and make sure they would not have to stand up and get more food in case they were still hungry. By taking away this convenience, students would only go and take more food if they were really hungry. As a result they would be more likely to finish their plates. **The data that was collected showed a 45 percent reduction in food waste in the sample week.** The result exceeded all expectations and supports the assumption that plate waste is avoidable and is not an implication of food that does not taste.

10 Green Goals

a) Purchase as much of the needed root vegetables and legumes as possible from Alaskan farmers. Potatoes and carrots last a long time, so stock up on these while they are available in the fall.

b) Establish a sustainability rating for all suppliers and steadily move away from less sustainable producers.

c) Name and analyze at least three factors that lead to plate waste by mid 2008.

d) Put actions into place that lead to a reduction of plate waste of 50 percent by mid 2009.

e) Reduce the travel distance of food to Alaska by 20 percent by mid 2009.

f) Find and analyze at least one food waste utilization option by the end of 2008.

g) Establish a food waste utilization program by mid 2009.

h) Have 10 percent of the food served been organically grown by mid 2009.

i) Find and analyze composting options and potentially interested parties by the end of 2008.

j) Run a composting facility that processes food waste of at least three organisations or corporations including UAF by the end of 2009.

Immediate Actions

a) Provide funding for food education programs to create respect for food, reduce negative health effects of poor diet, and reduce food waste

b) Reduce the amount of beef by 25 percent as livestock production is a major producer of greenhouse gas emissions SOURCE

c) Cut down on exotic fruits and lower the transport-related carbon footprint

d) Emphasize vegetables and meat produced in North America to shorten transportation

e) Remove trays in the Commons or replace with better alternative to cut down food waste

f) Abandon disposable Styrofoam containers from the Commons and establish a reusable-container system to reduce food related waste

g) Create a simple energy input labelling system for the food served so student have the information to choose the greener option

h) Add a 10c deposit on all disposable beverage containers and create a Recycle & Refund Station

i) Promote the use of personal mugs to save on disposables

j) Review plan and progress towards goals constantly

References

Kantor L. S., Lipton K., Manchester A., Oliveira V.(1997). “Estimating and Addressing America’s Food Losses”. National Food Review, Jan 1997

EPA (2007). “Waste Not/Want Not Wastes”. http://www.epa.gov/epaoswer/non-hw/reduce/wastenot.htm last access on April 16, 2008.

Eshel, G., Martin P. (2006). “Diet, Energy and Global Warming”. http://achangeinthewind.typepad.com/achangeinthewind/files/diet_energy_and_global_warming.pdf

7. Sustainable Campus Catered Event Guidelines

A. STRONGLY RECOMMENDED:

1. Food

- ☐ Use locally grown/produced foods whenever possible.
- ☐ Use organic foods whenever possible.
- ☐ Use fair trade coffees and teas
- ☐ Serve foods— such as fruits and vegetables or cheese and crackers—that are not individually packaged or that require utensils. Serve drinks, including water, in pitchers or other containers. Drinks in cans and bottles are one of the biggest contributors to waste on campus.
- ☐ Use washable dishes, cutlery, and glasses/cups. If this is not possible, use biodegradable dishes, cutlery and glassware.
- ☐ Use cloth tablecloths and napkins if possible. If not, at least use paper ones that are made from recycled paper.
- ☐ Avoid individually wrapped condiments (no sugar/sugar alternative packets, no salt/pepper packets, no individual creamers). Use bowls and shakers that can be reused and people can serve themselves. Milk/cream should be in original cartons on ice or in pitcher.
- ☐ Omit plastic coffee stirrers, paper doilies, straws, or packets of plastic flatware.
- ☐ Use sustainable table centerpieces – such as potted plants, local/pesticide-free flowers, cut tree branches, candles, or fruits that guests can take home.
- ☐ If you're having a buffet, use smaller than dinner sized plates for the food. This helps people avoid taking too much food that would just go to waste.
- ☐ Avoid using disposable, non-biodegradable packaging, such as saran wrap. Aluminum foil is preferred as it can be washed and recycled.
- ☐ If food is provided from local farms, note it as such. Place small cards in front of the food indicating what it is, from what farm, and where the farm is located.

2. Waste

- ☐ Coordinate with ASUAF Recycling to have the appropriate number of recycling receptacles in place (cans/bottles/mixed paper). If you hire caterers who will be present on site cooking and/or serving food, ensure that their staff comply with your efforts to make it a sustainable event by using the appropriate trash/recycling receptacles provided to them.
- ☐ Collect and reuse plastic name tag holders.
- ☐ Coordinate with a local food bank or soup kitchen to donate any left-over food.
- ☐ Provide **biodegradable** "To-Go" containers for participants to take left-over food with them.

3. Advertising/Printed Material

- ☐ Go Paperless: Post event information, downloadable versions of programs, handouts, and itineraries on a web site for event participants.
- ☐ Ensure that program guides, handouts, and other written materials are limited and, when needed, printed on 100% post consumer paper and double sided using a vegetable-based ink.
- ☐ For reoccurring or annual events, avoid printing dates and slogans on signs, posters, and banners so that they may be easily reused.
- ☐ 100% Paperless Advertising: Promote and invite electronically. Require participants to register or RSVP electronically as well.

B. RECOMMENDED:

- ☐ Hold the event during the day and in a location that will provide adequate natural lighting.
- ☐ Calculate the carbon footprint of the event and purchase renewable energy certificates (RECs) to offset the event's CO_2 emissions.ˆ
- ☐ Encourage and give incentives for the use of alternative transportation. Highlight bike routes to the event location and ensure that an adequate number of parking spaces for bikes are available. Provide resources on public transportation in the area including routes and schedules as well as the location of bike racks.
- ☐ Offer virtual conferencing. Make your event a podcast, Webcast or video conference for attendees who are not local.

8. Water Conservation

By Jennifer Kapla

Introduction

Water conservation refers to reducing the use of fresh water, through technological and social methods.

The purposes of water conservation efforts include:

· Sustainability – To ensure availability for future generations, the withdrawal of fresh water from the ecosystem should not exceed its natural replacement rate.

· Energy Conservation – Reduce the amount of well water treatment, water pumping, delivery and wastewater treatment which consume a significant amount of energy.

· Habitat Conservation – Minimize human water use to preserve fresh water habitats for local wildlife and migrating waterfowl and fauna.

Current Situation

Water used at UAF is from two primary drinking water wells and there is also a third emergency well. At this time, the campus does not have a shortage of water. However, the well water is processed to drinking water standards, an expensive process given how little of the water use is for human consumption. Also, our wastewater is treated by Golden Heart Utilities, and there is a cost involved for this service. Thus, even though we are not facing a water shortage, there is a financial benefit to water conservation measures that provide an incentive to conserve on the use of drinking water to irrigate lawns and gardens, flush toilets, bathe, and clean.

Storm Water Management

The 2002 Master Plan document states that the campus does not have a comprehensive storm drainage system. Generally, a ditch and swale system is used for site drainage. There are modest storm sewer systems for some building complexes, but only a few for parking areas. Also, The roof drainage of many of the older buildings (1950s and 1960s) connect to the sanitary sewer lines, contrary to contemporary regulations and will have to be modified as they are renovated. Due to the lack of storm sewer access, a drywell system with a surface swale back-up is being used for several building renovations. There is also no mechanism for determining the quality of the storm water reentering the natural system. Storm water management should be an inherent part of any site design. The U.S. Environmental Protection Agency has named storm water runoff as our nation's biggest water quality threat. Storm water runoff whisks pollutants from our streets to our lakes and streams via storm drains. Planting for clean water is part of the solution to water pollution because it mimics nature and natural hydrology.

In natural landscapes, rain tends to soak into the ground gradually. However, in urban areas, much of the land is covered by impervious surfaces - such as streets, parking lots and roofs - where the water cannot soak into the ground. Plantings help infiltrate water back into the ground and stop the storm water runoff. Raingardens are simply gardens with depressions that are designed to catch rainwater runoff, growing plants that tolerate being partially flooded on occasion. They provide beautiful landscaping and wildlife habitat. And, by soaking up rain where it falls, they slow storm water runoff, help prevent erosion, and remove pollutants in the process. Bioswales are storm water runoff conveyance systems that provide an alternative to storm sewers. They can absorb low flows or carry runoff from heavy rains to storm sewer inlets or directly to surface waters. Bioswales improve water quality by infiltrating the first flush of storm water runoff and filtering the large storm flows they convey. The can be used by parking lots for absorption of automotive pollutants, at downspouts to slow and direct rooftop rainwater, and along any hard impervious surface to slow rainwater.

These are some of the many options for storm water management that could be a group of solutions in future planning. More information on bioswales and low impact development for site design and planning techniques is available online at: ftp://ftp-fc.sc.egov.usda.gov/IA/news/BioswalesFS.pdf; http://www.deq.state.or.us/wq/stormwater/docs/nwr/biofilters.pdf; http://lowimpactdevelopment.org/

For more information on what to plant (native plant directory, seeds, prohibited invasives, help) see the State of Alaska Plant Materials Center website: http://www.dnr.state.ak.us/ag/ag_pmc.htm

To gather data to help assess the current water usage we used the Campus Consortium for Environmental Excellence Environmental Performance Indicators. The indicators and the information available for them are listed in Table 1. Decisions concerning water should be informed as possible; gathering and organizing data will be an ongoing challenge but will provide the information necessary to make decisions on sustainable water use now and in the future.

Total campus water use

Averages 94 million gallons/yr.

Per capita (faculty, staff, students)

~ 56 gal/per person/per day

Percentage of buildings
with water efficiency upgrades

We were not able to acquire this information.

Waste water disposal volume

82.5 million gallons/yr.
Per capita ~ 49 gal/per person/per day.

Waste water expense per year

For 3/2007 to 3/2008, the total amount paid to Golden Heart Utilities for waste water treatment from the physical plant, campus, and the farm was $603,642.

Storm water runoff management
(groundwater/surface water contamination levels)

Currently this is recognized by the University as an area that needs improvement and recent federal regulations will help guide the steps taken to mitigate runoff and contamination.

Impervious Surfaces

Natural resource management graduate student Jennifer Jenkins is currently mapping impervious surfaces throughout the Fairbanks area using the highest resolution images available, so we requested that she compile the data for UAF. A map of her results is shown in Figure 1. Her data indicate that almost 13% of UAF is impervious. Ms. Jenkins is also identifying the change in wetlands between 1939 and 2003, but this data is not yet available. When it becomes available, UAF should designate the remaining wetlands as protected areas.

Impervious surfaces at UAF (including gravel roads)	- 105 hectares	- 259 acres
Total surface area of UAF campus	- 826 hectares	- 2,040 acres
Impervious Area as Percentage of Total Campus Area	12.7%	

Courtesy of Jennifer Jenkins, Wetlands Status and Trends Project, US Fish and Wildlife Service, Fairbanks, Alaska.

Plan for more sustainable water use

5.1.1. Vision and Mission Statements

UAF is committed to the conservation and wise use of water resources through a balanced program that protects, restores, and improves the resource.

Mission Statement – Reduce potable water use while protecting and conserving all water resources within the campus watershed through implementation of efficiency measures, collection technologies, re-processing and re-use.

Goals

- Apply an integrated landscaping approach that recognizes vegetation, soils, pavement, and storm water management as interlinked, and helps to restore the quality and capacity of the regional watershed.
- Minimize use of potable water for irrigation and other uses where potable water is not required. This will increase the water retained for purposes on campus which require potable water.
- Prepare a storm water plan. All storm water will be treated onsite to ensure it exits the site in an unpolluted state.
- By 2015, decrease water use by 20% below 2009 levels through the use of conserving technologies and community education. This would be an approximate reduction of ~19 million gallons in 6 years. In one year the University of Wisconsin, Oshkosh replaced 1005 older toilets to new low flow equipment and reduced their water consumption by 11 million gallons (http://www.uwosh.edu/assets/announcement/sustainability/docs/Campus_Sustainability_Plan_Final_body.pdf).
- Reduce infrastructure for water use (sewer lines, drinking water distribution lines, and storage facilities) to the maximum extent possible. More information on infrastructure and state and federal monies available for infrastructure projects is available online at: http://www.epa.gov/waterinfrastructure/
- When the new study by Jennifer Jenkins, Status and Trends of Wetlands in the Fairbanks Area, is completed, designate the delineated wetlands on campus as Protected Areas.

Strategies

- Apply sustainable design principles and innovative site design techniques to all future projects to minimize adverse environmental impacts on ecologically sensitive areas and the regional watershed.
- Build new projects on sites that have already been developed disturbed? wherever possible.
- Reduce storm water runoff through on-site mitigation techniques such as rain gardens, green roofs, thick plantings along foundations, and bioswales when appropriate.
- Install rainwater storage and reuse systems in new construction projects and in major renovations whenever possible.
- Minimize the need for irrigation through the use of drought resistant plantings and placing plants where the soil types meet their requirements.
- Install low flow shower heads and aerators in 30% of all fixtures by 2010 and 95% by 2012. Upgrade toilets and urinals to low flow models by 2020.
- Reduce lab water use by installing efficient appliances and closed circuit water-cooling systems.
- Educate the campus community regarding efficient water usage.
- Meter buildings larger than 28,000 square feet and place smaller buildings into a clustered meter in order to better evaluate water usage and progress. Encourage contests for which building can reduce water use the most.
- Develop a tracking program to record data on water treatment, usage, disposal, and quality to ensure proper management and tracking. The U.S. Environmental Protection Agency Energy Star Portfolio Manager helps you track and assess energy and water consumption within individual buildings as well as across your entire building portfolio. This tool and more information are available online at: http://www.energystar.gov/index.cfm?c=evaluate_performance.bus_portfoliomanager.

9. Landscape / Biotic Environment

By David Hite

Vision

UAF's landscape and biotic environment outwardly represents the university's commitment to maintaining a sustainable future for campus and community. UAF is committed to protecting and maintaining the natural campus environment through restoration, preservation, and education while enhancing the campus as a classroom. This includes recreational areas, building landscapes and native habitat.

Current Sustainable Practices

The UAF currently supports sustainability management practices on campus. These include the use of native plants within the plant pallet guidelines outlined by Cooperative Extension Services, the use of cuttings from existing plants on campus to grow new trees and shrubs, and substituting compost to offset the amount of fertile required. Grounds and maintenance will start mulching grass into the lawns instead of collecting them. The university has implemented the use of an "Eco-dump" where campus maintenance debris and waste is composted. Compost is also used to amend flower beds and top dress turf areas and shredded bark is used for mulching. Pesticides used on campus are kept to a minimal amount of only 10 gallons a year. The estimated water use for irrigation of lawns and flower beds during the summer months is 50,000 gallons per day.
The university employs the use of electric golf carts for grounds maintenance and transportation on campus. Bicycles with trailers in tow are used to pick up litter and debris around campus. The Facilities Services green house has installed solar panels to heat water for its operations.

Goals / Action Items

UAF will use sustainable practices in managing its landscape and biotic environment in a sustainable manner. The following are proposed goals and action items that will promote the university's sustainability of its campus landscape environment to a greater level.

Water

- Build collection sites to collect water run-off for irrigation. This should be considered for existing and new building sites on campus.
- Use gray water to water the lawns instead of pumping and treating fresh water from the wells on campus. Lawns are currently being irrigated with treated water which is unnecessary for lawns and gardens.
- Cut treated water use for irrigation by *25%* by *2010*.

Plants

- Map and inventory the invasive species currently on campus.
- Develop an official invasive plants control plan for the UAF campus by the *summer of 2009*.
- All new and future lawns on campus should be replaced with native vegetation.
- Designate multiple areas for community gardens for use by students, staff, faculty, and the public. Many universities have organic gardens where courses are offered in gardening and the produce grown is used by campus dining services.
- Plant trees around parking lots on campus. This will improve the aesthetics of parking lots as well as provide a buffer between the roads and parking areas.

Landscape/Biotic Environment

Continue to designate areas of campus that will be protected from any future development and inform campus and community of such designation. Designating green belts and connecting green corridors and trails in the Fairbanks areas are gaining much public support and is presently being pursued by many local organizations. UAF should be a leader in this movement.

Set up biodiesel processing and use biodiesel powered landscaping equipment by *year 2012*. Biodiesel is one of the most sustainable fuels being produced. A study by the US Department of Energy has found that biodiesel production and use, in comparison to petroleum diesel, produces 78.5% less CO2 emissions. Furthermore, biodiesel has a positive energy balance. For every unit of energy needed to produce a gallon of biodiesel, 3.24 units of energy are gained.[11] Biodiesel can be used as a pure fuel or mixed with petroleum diesel and works in any diesel engine with little to no modification. Biodiesel processing can be achieved through the collaboration of departments within UAF to develop and implement a biodiesel program. The cooking oils use for processing the biodiesel can be obtained from UAF dinning services as well as area restaurants and eating establishments interested in promoting the sustainability initiative. Such a program would establish UAF as one of leading sustainable campuses in the nation.

Education

- Post signs to create awareness of the sustainable practices being practiced on campus. Post a signs in areas that are using compost instead of fertilizer, in areas that have native plants, and in areas identifying invasive plants (pre- eradication). Signs should be posted on the walking and ski trials informing community users that UAF has designated lands that will be protected from future development and is part of a sustainable campus initiative.
- Offer a course about campus / community sustainability that is specific to area's landscape and the biotic environment.

[11] National Biodiesel Board, www.biodiesel.org

Socially Sustainable Campus

Robin Andrews

Overview

What is social sustainability? Social sustainability creates a society that meets people's basic needs for food, shelter, education, work, and safety. It creates an equitable, tolerant, and diverse society. It works to promote the physical, mental, and social being of its members. It preserves are biological and cultural diversity. It promotes education, creativity, democracy and requires citizen participation in decision making (Hancock 2008)

A sustainable campus is a campus where people succeed. We want to create an environment which launches creative, confident, skilled professionals into the workforce. We want a supportive responsive university were the faculty, staff and students can do their best work. Our University needs to constantly reach out to our community and our world in a positive and productive way. The University of Alaska Fairbanks should set an example of what sustainability means.

A sustainable university is a supportive and just university, a diverse and tolerant university. It's a place where dreams come true, where research creates new possibilities and where vision becomes reality. In order to achieve these goals, we need to support our faculty, staff and students. We want a workforce that leads happy productive balanced lives. We want our students to discover their potential and achieve their educational and personal goals. We want our students, staff, faculty, and alumni to be proud of our achievements and enthusiastic about our possibilities. We want to be a model for what a University can accomplish in education, research, and community service.

Socially Sustainable Education: Financial Support

Student wages at UAF have not increased since 2003 and lag far behind what comparable jobs pay in the community. Between 2003 and 2007 undergraduate tuition has increased 30 percent. Graduate tuition and the cost of housing on campus both increased 40 percent. We need to raise student wages at least a dollar fifty at the all job levels. We also need to increase student wages annually to account for cost of living increases.

We need to maximize non loan sources of funding for education and reduce unsubsidized loans. Too many students are coming out of our university with huge debt. According to a University study, 52 percent of our students have on average 28,204 dollars in debt for their undergraduate educations (UAF Planning, Analysis, and Institutional Research 2007). With interest and deferment periods, many of these students will end up paying back twice that amount. Many students obtain credit cards during college. Credit card debt also represents a significant threat to a student's financial future. Student loan debt and credit card debt can be a huge burden in a tight economy. Mismanagement of debt can have long term consequences. It may delay the purchase of homes or limit the possibilities of further education. It causes individuals high anxiety and limits their professional possibilities pushing people toward higher paying jobs over those most allied with their long term career goals.

We need to spend more time educating our students about the dangers of student loans and credit card debt and their potential life long affects. Before a student takes out a loan, the student should attend an educational seminar on the terms and conditions associated with their loan, what that means in monthly payments, and what other alternatives are available. The University will offer a class for students on personal finance and managing debt.

To make education at UAF even more affordable, we need to reduce the price of on campus housing. On campus housing is expensive with rents of about 450 dollars a month for half of a double room. Students can find much cheaper housing off campus where they won't have the additional expense of the board plan. Low cost on campus housing will make us a "greener" university and enhance the campus community.

Plan Objectives: Financially Support Students

Increase student wages 1.50 an hour in all job classes

Increase student wages annually to adjust for cost of living

Direct students to non-loan funding sources
Decrease student use of unsubsidized loans
Educate students about long term consequences of debt
Make sure students with loans understand terms and conditions of loans
University will offer courses on finance and managing personal debt
Reduce the cost of on campus housing

Socially Sustainable Students: Student Health and Well being

For many students living away from home for the first time is challenging. Students lack the social support provided by their families and may be separated from their friends as well. The freedom of the college environment gives young people greater access to alcohol, and drugs. Use of Alcohol and drugs can impede academic achievement and lead to addictions. Every year college students die from binge drinking and drugs use. Driving while intoxicated also results in college fatalities every year. Many college students will have their first sexually intimate relationships in college. Students are still finding out who they are and who they are attracted to. Away from home, young people may discover their values may be very different from their parents or high school peer group's values. The breakup of intimate relationships can have devastating effects on self esteem and lead to depression. Sometimes sexually intimate relationships are predatory. Students can become victims of physical, emotional, and sexual violence. About two rapes are reported on campus each year and a lot more are not reported. Law enforcement needs to help us create a safe campus, not be something students fear. College can be a very socially and academically stressful environment. Suicide is the number two cause of death in college students (UAF Center for Health and Counseling, no date).

We need to do all we can to help students through what can be difficult decisions, discoveries, and experiences. We need to help students connect to each other, our faculty and staff, and those organizations at the University and in the Fairbanks community. Support creation and continuation of university clubs and organizations that support and connect students. We need to build a campus where students make smart decisions about drugs, alcohol abuse, and relationships. We need to create a campus where illegal drugs use, driving while intoxicated, and predatory relationships are rare. A campus where people drink responsibly and students look out for each other. A campus where sex is safe and pregnancies are planned.

America has a health care crisis and our University is no exception. Every semester students are sick, get hurt, and become pregnant. But our health center is only active in the spring and fall. Student medical insurance is inadequate. Undergraduate insurance is extremely limited and lacks mental health parity[12]. Graduate student insurance is limited to people with funded graduate positions and also lacks mental health parity. Dental coverage is very limited. In the event that our students do not have additional coverage, they can not afford to have a major accident or a long term illness. We need the UAF health center to be open year round and to add basic dental services. We need improved health insurance with reasonable mental health care coverage and dental coverage.

Plan objectives: Student Health and Well Being

Create a campus educated about the dangers of alcohol, drugs, and sex
Create a campus that discourages illegal drugs use and irresponsible drinking
Create a campus where driving under the influence and rape doesn't occur
Create a campus that fosters healthy relationships among students, faculty & staff
Create a campus that doesn't tolerate physical, emotional, or sexual violence
Create a campus where people are free to find themselves
Create a campus where people can be open about who they are and who they love
Create a campus where sex is safe and pregnancies are planned
Create a safe campus where law enforcement is a positive force in the community
Create a campus where students can find the resources they need to succeed
Create a campus that supports student involvement in clubs and organizations
Create a campus with year round health care
Expand health center services on campus to include basic dental care

[12] Mental health parity is when mental illnesses are covered under the same terms and conditions as physical health care.

Expand health insurance to increase dental care and create mental health parity

Socially Sustainable Faculty and Staff: Wages and Benefits

Staff members are currently under paid. White collar staff members are without union representation. Staff salaries at UAF need to be increased to be comparable with similar jobs with state, federal, borough, and private employers. The white collar staff should be encouraged to reevaluate the benefits of union representation. When staff positions are evaluated at a new higher grade, staff in these positions should receive appropriate salaries to their grade and experience.

Staff and faculty health care needs to be expanded and made available to more people at UAF. Adjunct faculty members teaching 6 or more credit hours per year should be able to participate in the faculty and staff health care programs. Temporary staff should be covered after 60 days of employment. Mental health parity should be provided under all health care plans. Deductibles and out of pocket maximum should be calculated on a per individual basis, such that larger family units pay more. To make this more affordable for families and encourage responsible family planning, no additional charges with be assessed for the first child. Vision benefits should be adjusted to account for increasing prices of lens, frames, contacts, and include new vision services.

Plan objectives: Wages and Benefits

Evaluate wages of staff and compare to wages of similar positions in community
Adjust wages where appropriate to be comparable to similar positions
Encourage white collar staff to reconsider benefits of union representation
When jobs are reevaluated upwards increase salary appropriate to experience
Offer health care coverage to adjunct faculty teaching at least 6 credits
Temporary staff should become benefited after 60 days of employment
Provide mental Health Parity in all health care plans
Promote and reward responsible family planning
Deductibles and out of pocket expenses should be calculated per individual
Larger family units will pay more for deductible and out of pocket expenses
Deductible and out of pocket increased will not be assessed for first child
Vision benefits will be adjusted for increasing prices
New vision services will be included in updated vision benefit packages

Sustainable Parents: Childcare

Our University needs to expand the childcare services it provides. We need to create childcare facilities for 100 children ages 18 months to 6 years and after school and summer care for 150 children aged 6-12, add service for 25 children under age 18 months. Too many faculty, staff and students need to bring their children to work or the classroom. The University should provide a limited use urgent childcare drop off service to cover unexpected childcare gaps. Filling these gaps will reduce parental anxiety and allow everyone to attend classes and meeting without disruptions. Enhancing child care facilities on campus will provide student jobs and create additional educational environments for students in early childhood development and elementary or middle school education programs. Excellent, affordable, available childcare will increase the productivity and reduce the anxiety of our students, faculty, and staff.

Plan Objectives: Childcare

Provide childcare facilities for 100 children 18 months–6 years
Provide after school and summer child care facilities for 100 children 6-12 years
Create new child care service for 25 children under age 2
Provide student jobs and educational opportunities for our University students
Create limited use emergency child care service to cover unexpected gaps in care
Provide excellent affordable available child care to campus community

Socially Sustainable Investments: Sales, Developments, and Investing

Our University needs to set an example and buy and sell "green" socially responsible products and practice transparent responsible sustainable development and investing. Products sold at the UAF should have been created under reasonable working conditions. We should avoid products from unpaid prison labor or products which were created using slave or child labor. It can be difficult to investigate products. Different value systems will evaluate socially responsible products relative to their societal values. But just asking the questions will tend to create better work places world wide. Tell the world, we care about the people making the products that with have the insignia of our University on them. We want workers to have choices, work under safe conditions, and receive reasonable pay. The University should buy and sell local products when possible. Local products tend to reduce fossil fuel use in transport and also help support our local economy making Fairbanks a more viable place to live.

The sale, development and investment practices of the University need to be sustainable. In order to achieve this, we need create greater transparency and availability of information about what the university owns and how it invests. The University community should be able to readily access this information and the people of the state of Alaska should have input into the University's financial and environmental decisions. We need to create a committee to oversee the sale, development, and investments of our University. The committee will form guidelines for environmental sustainable development and sale of University assets. The committee will also investigate University investments and create responsible investing parameters. University developments, sales, and investing shall be socially and environmentally responsible. We will avoid development or sale of land that will cause significant long term environmental damage. We will not invest in companies that cause significant environmental harm or refuse pay for accidental damage to the environment. We will not invest in companies whose primary mission is to create weapons. We will not invest in companies that do no provide reasonable working conditions including fair wages, equitable hire, and safe working conditions or use child, unpaid prison, or slave labor. We will invest in companies developing "green" technologies and researching advances in medicines and technologies that will improve the quality of human life.

Plan Objectives: Sales, Development, and Investing

Buy and sell "green" socially responsible products
Buy and sell products created under reasonable working conditions
Avoid products created using unpaid prison, slave, or child labor
Avoid products created under unsafe working conditions
Avoid products for which workers were no paid a living wage
Buy and sell local products when possible
Have transparency and accountability in development, sales, and investment
Practice sustainable development and sale of University assets
Form a committee for sustainable responsible sales, development and investing
Create guidelines and parameters for sustainable asset management
Avoid sales or development of University land causing environmental damage
Do no invest in companies causing environmental damage
Do not invest in companies that do not pay when they damage the environment
Do no invest in companies whose primary mission is creation and sale of weapons
Do not invest in companies without fair wages or equitable hire
Do not invest in companies that do not create safe work places
Do not invest in companies using child, unpaid prison, or slave labor
Do invest in companies creating "green" technologies
Do invest in companies researching medicine and technologies improving life

Social Sustainability: Happiness

At UAF happiness is a good parking spot. A great deal of time, productivity and good humor is lost in the search for good parking and using the sometimes ill timed bus system. To create greater happiness, I propose creating a 150 spot multi-story parking lot in the Taku lot with an elevator and a heated enclosed walkway into the central campus area. We should market this garage to our gold sticker users and greatly reduce gold sticker

parking elsewhere in the central campus area. The garage would also have spots for the public at a day user fee allowing greater access to the library and other public facilities during business hours.

We need to provide our students with better access to affordable nutrition. Poor nutrition limits our potential as students and employees. We should have more fresh fruits and vegetables at our dining services at affordable prices. We should have fruit and vegetable sections available in our vending machines along with more "real" food as opposed to strictly low nutrient snack items. Meal plan flexibility needs to increase and more dining options need to be available as our campus grows.

The university student union facilities are inadequate. Expanding wood center is not our best option due to limited parking availability. We suggest creating new facility on the vacant lot across from the SRC. The facility should have meeting rooms, an auditorium, shower and laundry facilities, and a coffee house. This new facility would enhance campus life options for off campus students and be inviting to community members wishing to take part in university activities.

Plan Objectives: Happiness

Built a multi-story parking garage with an elevator and heated walk way
Market to Gold Sticker users to free parking spaces in other lots
Create parking in garage for public users
Provide nutritious affordable food on campus
Provide more fruits and vegetables at dining services and vending machines
Provide more meal plan flexibility
Provide more dining options and facilities
Create new student union in a location with good parking
New student union should include meeting rooms, and auditorium
New student union should include shower & laundry facilities and a coffee house
New student union should engage off campus students and community members

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10. Integrating Sustainability into the Curriculum

> "Universities as a whole are embracing the notion that sustainability is something that has to be taught and not just to people in environmental science or sustainability…we need it as much as English and History,"
>
> Tom Kimmerer, Association for the Advancement of Sustainability in Higher Education.

> "It's a fundamental shift in how higher education sees its mission. You're seeing it integrated into curriculum, into MBA and PhD programs. These programs are going to train the leaders of tomorrow who will be able to take on the significant environmental challenges of the next 50 years."
>
> Andy Coghlan, The Alliance to Save Energy.[13]

Educating students now about their environmental impact will have a lifetime effect on the choices they make in regards to sustainability…

No student in NRM430 worked on education/curriculum, so the following is from UCSB sustainability plan to give us an idea of what might be included in such a section.

1.1.4 Short-Term Goals (0-1 years)

Goal 1: Complete a full sustainability assessment of UC Santa Barbara's academics and research program (summer 2006 - Summer 2007).

The Academics and Research Functional Group examined a number of different aspects of this goal, including courses related to sustainability and the relationship of the courses to the general education requirements. The Group was also interested in how many students attended classes on sustainability, as well as the number of faculty who were teaching related courses or conducting relevant research. The Group concluded that little could be done to increase sustainability in academic and research programs without first assessing the current situation.

Actions

1: Identify indicators to assess academic and research programs related to sustainability.

The Group developed the following fourteen indicators to facilitate preparation of the sustainability assessment:

- Number of courses related to sustainability
- Number of courses related to sustainability which fulfill a general education requirement
- Number of students in courses related to sustainability
- Number of research groups working on issues of sustainability
- Number of faculty researching a topic related to sustainability
- Number of students researching a topic related to sustainability

[13] http://www.greenbiz.com/news/reviews_third.cfm?NewsID=35692

- Amount of funding for research on sustainability
- Number of alumni in professions related to sustainability
- Number of undergraduate students who have taken a course related to sustainability
- Number of graduate students who have taken a course related to sustainability
- Number of courses with applied or service learning
- Number of students collaborating with non-profits
- Number of students collaborating with businesses in sustainability
- Natural sites used for teaching: Natural Reserves, teaching plots of landscaping on campus, Natural

Restored Areas, demonstration projects (bioswales, etc.)
The Academics and Research Group will evaluate each of these indicators within one year (summer 2006 to summer 2007).

Preliminary calculations of the number of courses related to sustainability suggest that there are about 389 courses directly related to sustainability and 284 courses secondarily related to sustainability across both undergraduate and graduate curriculums. This data was collected through a keyword query of the Academic Senate database of courses offered on the campus. The Group is refining its methods for querying the data since sustainability is such a holistic concept that defining sustainable curriculum and research is difficult.

Barriers
Most of the above indicators can be assessed within a year but there are a number of challenges:

- It is not easy to determine the number of alumni in professions related to sustainability because departments can be protective about alumni lists.
- Identifying the number of courses with applied or service learning components is complicated by decentralized data sources and requires interviews with many departments and professors.
- A number of issues revolve around a clear definition of what constitutes sustainability and how to standardize the concept when collecting data from various sources.

Goal 2: Have at least 20% of the faculty know where to find resources on bringing sustainability into their curriculum.
The Environmental Issues Task Force completed a report on ways to connect departments and faculty working on environmental education and how to publicize sustainability-related courses and research. Many of their recommendations are parallel to the work of the Academic and Research Group. The Group would also like to build these recommendations into five major sub-sections of courses related to sustainability: foundational, issues and problems, direct tools, solutions and synthesis. Courses in the "synthesis" category should address at least two of the environmental, social, or economic issues and solutions. It is also important to note that the scope envisioned by the Group is broader than the scope of the Environmental Issues Task Force because it includes social and economic issues and solutions as well as environmental issues.

Actions
1: Develop a regularly maintained sustainability website with instructional resources for faculty that is linked to an appropriate section of the university website.
2: Create and highlight flexible course modules relevant to sustainability on the website.
3: Have a sustainable website operational within a year (summer 2006 - Summer 2007) and within two years have a long-term commitment to properly maintain the website.
4: Collaborate with the Environmental Issues Task Force.

Goal 3: Have at least 30% of students know where to find a course on sustainability.

A survey of undergraduate students in fall 2003 by Associated Students found that less than 20% of undergraduates (3,188 respondents) reported that the issue of sustainability had been addressed in at least one of their classes at UC Santa Barbara. One of the first and simplest steps to increasing this percentage is increasing the awareness and marketing of courses related to sustainability.

Actions

1: Create a fully operational website that highlights sustainability-related courses within one year (summer 2006 - Summer 2007).

2: Update the website every week, so that it is regularly maintained and outreach keeps up with high student turnover.

Barriers

In the long-term, the most significant barrier to achieving this goal is consistent funding for the website.

Goal 4: Have at least 20% of the students know where to find an internship and/or job related to sustainability.

Counseling and Career Services provides a centralized location for internship matching efforts; however, there is no effort to track which internships relate to sustainability, and no specific encouragement of students to pursue internships with sustainable companies unless requested by the student. There are also internships available through departmental programs not directly related to Counseling and Career Services.

For example, the Environmental Studies Program has one of the strongest departmental internship programs on campus. Since 1973 more than 2,600 students have earned academic credit for completed internships through the Environmental Studies Internship Program. The Cheadle Center for Biodiversity and Ecological Restoration works with over 50 student interns each year and many more volunteers.

Actions

1: Collaborate with Counseling and Career Services to emphasize “green business” internships and job opportunities at the fall 2006 Career Fair and the Science, Technology, Business and Beyond Fair.

2: Offer workshops on how to pursue careers in sustainability.

Goal 5: Encourage the Academic Senate to create a working group to address sustainability within academics and research.

It is essential to engage faculty in issues of sustainability, both in terms of their leadership in academics and research and in terms of their role in campus governance and management. The Academics and Research Group will collaborate with the Academic Senate and other key academic committees and representative bodies on campus to develop sustainability initiatives.

Action

Present at an Academic Senate meeting on the Campus Sustainability Plan and solicit feedback for the next steps in building a collaborative relationship with the Academic Senate in fall 2006.

Barriers

The Academic Senate has been working to eliminate unneeded committees and may not be open to creating a new committee.

Goal 6: Create a publication of the current sustainable practices at UC Santa Barbara related to academics and research and use this publication to highlight interesting courses and research.

There are currently many courses and research projects related to sustainability at UC Santa Barbara, but there is very little recognition of their existence or successes.

Action

Host a one-day symposium highlighting sustainability efforts in academics and research in spring or summer 2007. Publish the findings and proceedings of the symposium.

Two versions of the publication will be designed and distributed. The first version will be for faculty in other disciplines at UC Santa Barbara and other schools. The second publication will be to publicize sustainability efforts to off-campus communities.

Barriers

The greatest challenges will be providing incentives to contributors to submit interesting work to the publication and publishing the proceedings.

Goal 7: Develop funding to achieve the goals of the Group.

The Group understands existing funds are limited and wants to identify diverse potential funding sources such as grants and donors.

Actions

1: Determine the cost of the goals and actions and identify possible funding sources for the first 5 years. This should be completed by winter 2007.

2: By the end of fiscal year 2006-2007, secure adequate funding to complete the Group goals.

Barriers

At UC Santa Barbara, there is no access to a development officer for this work and there are many competing initiatives even within the field of sustainability. The Group hopes to overcome some of the competition for funds and pool its skills to create collaborative funding strategies with other entities.

Goal 8: Set mid term and long term goals.

Due to insufficient assessment data measurable goals are only set through 2006-2007. The Group has yet to engage key faculty committees which will be essential to the development of further proposals.

Action

Set mid term and long term goals by summer 2007.