Survey of Composting as a Method of Waste Reduction at Northern Universities and Colleges

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Abstract

Global warming, caused by human activities, is one of the most profound problems facing our world today. ‘Sustainability’ is a framework of re-thinking ways in which our society operates to reduce the harmful impacts of human existence on earth by, in part, using less energy, and depositing less waste. The University of Alaska Anchorage (UAA) signed the Talloires Declaration in 2004, committing to the introduction of sustainable practices, and in 2006 signed the American College and University Presidents Climate Commitment, committing to the reduction of its carbon footprint. To date, the campus has progressed in energy-saving strategies and undertaken several recycling initiatives. The UAA Sustainability Council, the client for this project, asked if composting could be done at UAA to divert campus food waste from the landfill. Composting is a process by which food waste is transformed into a nutrient rich, reusable, resource which can be returned to the soil. The diversion of this food waste from the landfill would reduce the amount of CO$_2$ and methane generated by the landfill, reducing the carbon footprint of both the institution and the city. This paper is a survey of thirty-two (32) northern climate college and university campuses in the U.S. and Canada to determine what method of
composting is used by their campuses, and where possible, determine the use of resources, staff and students and the off-setting savings in dollars.
Introduction

Of all issues facing our world today, global warming is the most threatening. Human activities have sharply increased the presence of greenhouse gases carbon dioxide (CO\(_2\)) and methane, the cause of global warming. CO\(_2\), the principal greenhouse gas contributed by human actions is now at the highest level in at least 650,000 years. The concentration of methane gas is about 150% above pre-industrial levels. Since 2000, the growth rate of emissions has tripled over the average for 1990-1999\(^1\). Global warming, if allowed to continue will result in the rise of oceans, reduction of forests by tens of millions of acres, cause extreme negative impacts on ecosystems, and result in food shortages and create serious impacts on human health and well-being.

A carbon footprint is “the total set of GHG (greenhouse gas) emissions caused directly and indirectly by an individual, organization, event or product.”\(^2\) An individual, nation or organization’s carbon footprint is measured by undertaking a GHG emissions assessment. Once the size of a carbon footprint is known, a strategy can be devised to reduce it. When speaking about a ‘carbon footprint’ a distinction is made between a primary and a secondary footprint. The primary footprint is a measure of direct emissions of CO\(_2\) from the burning of fossil fuels including energy consumption and transportation (e.g. car and plane). We have direct control of these. The secondary footprint is a measure of the indirect CO\(_2\) emissions from the whole lifecycle of products we use - those associated with their manufacture and eventual breakdown. The composting process is an example of a secondary footprint. When we transport food
waste to an off-campus site such as a landfill, we add to our secondary footprint the amount of CO\textsubscript{2} generated by the landfill and the transportation method used.

Profound changes in public policy and changes in individual and social behavior are needed, to reduce our consumption and the rate CO\textsubscript{2} emissions, to sustain natural and human communities.

The international gathering of university presidents, rectors and vice chancellors who signed the Talloires Declaration in 1990 defined the role of the university in addressing environmental management and sustainable development thus: ‘Universities educate most of the people who develop and manage society’s institutions. For this reason, universities bear profound responsibilities to increase the awareness, knowledge, technologies, and tools to create an environmentally sustainable future.’ When the University of Alaska Anchorage signed the Talloires Declaration in 2004, it signed a commitment to ‘set an example of environmental responsibility by establishing institutional ecology policies and practices of resource conservation, recycling, waste reduction, and environmentally sound operations.’ But how does a university move from signing a document to implementing and living its intentions?

This issue is faced by every one of the almost 4,000 universities and colleges in the U.S. The question is, how to reduce consumption of water, energy, chemicals, natural resources, consumer products, labor and capital, and reduce waste (become more sustainable), and be an institution where students can be exposed to, and learn from, the sustainable manner in which campus operations are conducted.
For UAA the implementation of the Talloires Declaration becomes an issue of how UAA can best conserve its fiscal and other resources while engaging in sustainable, environmentally-friendly business facility management practices, and at the same time visibly demonstrating to its students and the community that sustainable operations and processes are good business for financial as well as social ends. Of practical importance to the institution is the fact that students and endowments are migrating to institutions of higher learning where sustainability is visually being pursued.
Background and conceptual framework

Back in the 1970’s when the public was just beginning to hear the phrase ‘global warming’ there began an increased focus, internationally, on restoring the health and integrity of the Earth’s ecosystems by reducing and eliminating unsustainable patterns of production and consumption, and reducing CO$_2$ emissions. Multiple United Nations international conferences, and U.S. reports and conferences focused on the issue of sustainability. Their focus has been, in particular, the role of higher education in affecting changes to the existing paradigm. (Calder and Clugston, 2003).

Beginning in 1990 university representatives convened several conferences around the world. Those conferences produced a series of internationally recognized declarations focused on higher education for sustainable development (HESD). Of the six major declarations, the Talloires Declaration has been favored in the U.S. (Appendix A). Among the tenets included were:

Set an example of environmental responsibility by establishing programs of resource conservation, recycling, and waste reduction at the universities.

Several organizations have been developed to help institutions of higher education cope with the transition. The University Leaders For Sustainability (ULFS), in addition to being the Secretariat for signatories of the Talloires Declaration, has a mission to support sustainability in higher education with a critical focus on teaching, research, operations and outreach, internationally. They support this mission through publications, research and institutional assessment.
In 1993 Second Nature was created. Dr. Anthony Cortese was a principal mover in its creation. In 2001, the Education For Sustainability Western Network (EFS West) was created through Dr. Cortese’s efforts. The goal was to get institutions of higher education to move away from a ‘fix-it’ mentality to developing an entire education experience that would change behaviors. It worked at creating a new framework in which higher education would operate as a fully integrated community that models social and biological sustainability. In 2001 EFS West became the Advancement of Sustainability in Higher Education (AASHE). It was formed to coordinate and strengthen campus sustainability efforts at both the regional and national levels at colleges and universities in the U.S. and in Canada. Their vision is to have higher education take a leadership role in preparing students and employees to achieve a just and sustainable society. The campus itself would serve as a model of sustainability, with both curriculum and operations reflecting an integrative approach to learning and practice. This organization produces an Annual Report of Sustainability in Higher Education (AASHE Digest 2007) which highlights the progress being made at campuses throughout the two countries. The Digest depends upon the STARS pilot program; a voluntary, self-reporting framework for gauging relative progress toward sustainability for colleges and universities.

Other organizations have also taken a critical interest in the progress of sustainability at institutions of higher education. The National Association of College and University Business Officers (NACBO) has a specialized website for ‘Campus Sustainability’. The National Wildlife Federation began reporting on sustainable practices
in 2003 and has since issued annual reports, available on the web, with a particular
‘Green Campus Recognition’ section.

This increased attention affects UAA. UAA’s students are watching for progress
in the institution’s visible movements towards sustainability. Students who are making
their decisions about which college or university they will attend are interested in which
campus is making substantial progress towards sustainability. Other institutions are
making their progress known through reports and conferences, all generally available on
the web. In keeping with its mission, UAA could model behavior that demonstrates
constructive movement toward the reduction of greenhouse gases, driving its carbon
footprint down, and diminution of its solid waste stream.

UAA has undertaken multiple initiatives over the past ten years including
developing an energy policy for energy conservation, creating a carbon footprint of the
institution, and obtaining LEED certification of new buildings. It has implemented paper
and cardboard recycling programs. UAA composts all of its landscape materials, in an
off-campus area. All in keeping with its stated commitment to ‘minimize emissions and
waste products which are likely to cause damage to the environment and reduce our solid
waste stream.’ It has not, however, done an assessment of the volume of its solid waste
stream. One of the components of that waste stream is food waste generated by eating
establishments on campus. NANA Management Services (NMS), an independent
operator, has been imbedded in UAA to provide catering and food services. Their kitchen,
in the Commons, produces most of the pre-consumer food waste on campus.4 Although
they are contractually responsible for the removal of their kitchen waste, that waste contributes to the institution’s carbon footprint.

Currently, UAA’s food waste is put into the municipal landfill, where it produces CO₂ and methane gases. Moving the food off campus for disposal does not reduce the institution’s carbon footprint, it adds to it the CO₂ emitted by transportation of that food to the landfill. One method that would reduce food waste would be to compost it, which would result in a reduction of CO₂ and methane produced, and recycle a waste into a nutrient rich product which could reduce the cost of the campus landscaping department.
Literature review

The magnitude of negative impacts directly related to the effects of increased CO$_2$ emissions in the world’s atmosphere has been increasingly reported upon by the international scientific, as well as economic and literary communities since the 1990’s. Climate disruption, loss of forests, loss of land through desertification, loss of fresh drinking water (world water crisis), loss of marine fisheries and loss of biodiversity are some of the major impacts that are being realized in today’s world. (Speth, 2008). There are actions that can be taken to reduce these impacts, and these actions are visible in the international ‘green movement,’ and surge of international campus organizing and student mobilization occurring today.

Blackburn (2007) lists several institutional benefits of pursuing sustainability; strategic institutional positioning by talking and walking on the ethical high ground; regulatory compliance; cost savings through waste reduction, energy conservation; strengthening community relations; enhancing students’ employment prospects with employers who are increasingly interested in sustainability, and attracting students, government funders, and private donors who are concerned about sustainability. A commitment to sustainability is also important to graduates who need to count on their alma mater’s ‘reputational capital.’

Colleges and universities are where the future leaders of all types of organizations, and citizens in general, gain their understanding of the issues and the options for dealing with them. By modeling responsible and ethical behavior, colleges and universities can raise the bar of normative behavior for all organizations. Experience
suggests that strong energy programs and strong recycling programs are prerequisites to credible campus environmental programs in general. Solid waste (and recycling) measures are highly visible. While sustainability initiatives are frequently grass roots efforts, financial management is the backbone of an institution’s top-down hierarchy. Attempts to justify proposed sustainability initiatives based on cost accounting as in dollars saved, or nonfinancial indicators of potential benefit, fail to cover the true savings and benefits realized. When financial pressures are present, short-term cost considerations and budget limitations are most frequently cited as the primary barriers to sustainability initiatives. (Litten and Terkla, 2007.)

Based on surveys carried out on a sample of higher educational institutions within London, UK, an assessment was done to judge the progress they had made with respect to greening (reducing their carbon footprint) within the areas of energy and solid waste management (Dahle, Neumayer, 2001). The study maintains that although the institutions are not at ground zero with respect to greening, their overall environmental quality is relatively poor, particularly concerning recycling. It is argued that the barrier to be of greatest significance by the interviewees, namely budgetary constrains, is at least partly due to a lack of knowledge concerning how greening initiatives can save costs as well as an institutional reluctance to change. It was concluded, therefore, that one of the most important measures that needed to be undertaken to overcome barriers to greening is to raise the environmental awareness within campus communities.

The Triple Bottom Line (TBL), a relatively new method of accounting, recognizes that social and environmental values are as important as traditional economic measures of
an organization's success when accounting for sustainable modifications to campuses. (Elkington, 1998). Social and environmental values are not represented in the market prices that directly affect management decision making. When making sustainable business decisions, these additional values must be taken into consideration. Taking values, such as the reduction of CO\textsubscript{2} and methane, into consideration can reduce the payback period considerably, and add value to seemingly small cost reductions derived from high-cost investments.

In 1995, a discussion paper prepared for the Sustainable Development Coordination Unit, Government of Manitoba observed that the methodology of measuring ‘sustainability’ was not standardized. Indicator categories and individual indicators were usually identified and validated through a focused exercise either using a public hearing or public consultation process. ‘The concept of indicator measurability and the transparency of the measurement process is critically important. Measurability means using quantitative versus qualitative indicators where possible.’ (Hardi and Pinter, 1995). That assessment has not changed, and in fact, has been institutionalized at many campuses. At UAA the process of measurement of energy use and assorted waste streams, as well as its current carbon footprint is just beginning. Having baseline data is critical in evaluating outcomes.

AASHE’s Green Report Card 2007, through data compiled from independent research and survey responses, reports that food composting programs exist at 55% of the schools surveyed and 46% report composting of landscape waste. The AASHE Digest is
one among at least six separate organizations’ attempts to evaluate campus sustainability performance in 2007, where quantitative data is being reported.

The University of Montana, Missoula, has used on-campus composting and in April 2004 produced a report documenting their demonstration project. The report illustrates one method of in-vessel composting and enumerates the start-up costs and makes recommendations regarding operations and personnel. (Appendix D). The method that they report upon is included here since a number of other campuses surveyed in this document utilize the same method.
Research methodology

The survey undertaken was designed to determine what methods were being used by university and college campuses in northern climates to compost food waste. By choosing only northern U.S. and Canadian institutions the length of winter season, severity of winter season, and snow accumulation would be analogous to the UAA campus. The prime consideration in this survey, therefore, was geographic location. While the number of students attending an institution has a direct bearing on the number of meals served, and food waste generated, student population at each institution was a secondary consideration. By choosing institutions primarily based on geography, a wider number of composting options was surveyed.

When the University looks for policy models it frequently refers to its peer institutions designated by the Carnegie classification. This classification has designated 22 institutions as comparator peers to UAA. (Appendix A). Beginning with this classification list, only the two northern U.S. universities of University of Massachusetts Boston, and Boise State were surveyed on line, through their respective websites, to determine if composting was being done on their campus, and were added to the database. The second source of institutional information was obtained through the AASHE Report Card 2007. Eight institutions of higher education were added to the database. The remaining institutions surveyed were determined by location and a state-by-state website search.

Each website was surveyed with the intent of answering the following questions:

- Did the institution compost?
• Did the compost remain on campus? Get removed by a contractor? Get removed by the municipality?
• What was composted – pre-consumer or post-consumer food waste?
• If pre-consumer, who handled the food waste (students, staff)?
• If post-consumer, was the waste separated into compostable and non-compostable?
• If separated, how were consumers trained (i.e., method of separation), and how effective was the process?
• If not separated, what modifications were made to serving ware (corn or sugar cane products used so they could be composted)?
• Were there any cost estimates for instituting composting systems?
• Was there anecdotal information on how composting was implemented?
• Had the institution gone ‘tray-less?’ Any estimates of the effect of going tray-less on the amount of waste produced?

When a substantive list of institutions was developed, and a determination was made as to what process they were using that might be used on the UAA campus, those which appeared to be composting on campus with an Earth Tub (6) were contacted by email. (The decision to contact only those using an Earth Tub was made based upon conversations with UAA dining services personnel who provided preliminary information on the amount of pre-consumer waste being generated.) These six campuses were solicited to complete a nominal survey (Appendix B). This instrument was designed to acquire more complete information to determine if an assessment had been done of volume of food waste being generated, volume of food waste being composted, number of students and staff involved, if permanent staff managed the operation, changes that were made to procurement (i.e., biodegradable dishware), costs incurred, and cost savings. Delays in the return of questionnaires required personal phone calls and a redesign of the instrument to a very simple email questionnaire (Appendix D).
Conversations with Alaska Pacific University (APU) Dining Services personnel and a student involved in the composting done at APU took place to determine steps that had been taken at APU to reduce food waste and discuss their composting method.

Conversations with NANA Management Services and university representatives of UAA Dining Services occurred to determine what steps were being taken to minimize food waste, how much food waste was being generated, and determine possible savings that could be made if composting was introduced.
Research Findings

Terminology

Composting is defined as "the biological decomposition of organic waste materials to produce a stable humus or soil-like product." Natural composting is a relatively slow process produced by mixing appropriate amounts of carbon and nitrogen organic material. It takes twelve weeks to six months in an outdoor environment, through heat generated by microbes, to decompose the materials, and produce a stable end product. Over time, portions of the pile or row can become so dense that air does not circulate, and obnoxious odors are produced. This is called the anaerobic (meaning absence of oxygen) decomposition process.

Pre-consumer food waste is created in food preparation. The composting of pre-consumer food waste is a straightforward process of using only vegetative material. The composting of post-consumer food waste is compromised by a necessary separation process of non-compostable materials such as meat and bones, non-biodegradable serving ware such as plastics, or packaging such as cellophane and plastic wrappings, from compostable materials.

The term ‘tray-less’ refers to a dining hall procedure of having students fill only the plate and cup they will use during a meal, and not having a tray available. The reported result of going ‘tray-less’ has been a significant (approximately 30%) reduction in the amount of food waste generated6.
Data evaluation was done to determine where campuses were conducting composting, and the method of composting used.

Of the 32 campuses surveyed, 41% (13) were composting on campus (on-site), 33% (11) were composting at agricultural extensions of the campus, 16% (5) were depending on compost contractors to pick up and remove the food waste to private, off-campus composting facilities, and 10% (3) were transporting their food waste to municipal composting facilities.

Of those campuses composting on-site (13), the next question asked was what process was being used. There were only three methods. The first was small food waste operations that used an outdoor, three bin method and worked the compost by hand in a traditional manner. The second, for more substantial amounts of food waste (40 to 200 pounds per day), the Earth Tub was used, primarily for pre-consumer waste. The third
method, for very large amounts of food waste (750 pounds to 10 tons per day), a Wright System was used. This largest system could compost both pre and post consumer wastes at once.

The Earth Tub (Appendix F) is a self-contained aeration and mixing system. It operates as a continuous batch process where more material is added daily until the tub is full. After a 14 day cycle of adding material on a daily basis (up to 200 pounds) the full tub is allowed to sit for a 14 day period to cure. The insulated vessel holds in the heat generated by composting for all-season composting. The floor of the container is perforated to allow air to be drawn into the bottom of the vessel. Bulk material, such as wood shavings, is added to absorb excess moisture. This method requires access to electrical outlets, and drainage capability to offload excess moisture. These vessels can be operated outdoors, according to the manufacturer, twelve months of the year.7
The Wright system (Appendix G) accelerates the aerobic composting process; moisture, temperature, oxygen and the initial carbon/nitrogen ratio are monitored and controlled within ideal ranges for maximum microbial activity by computer. The composted material is aerated by mechanical means to ensure that there are no anaerobic pockets in the mass. The accelerated aerobic process is brought about by naturally-occurring microorganisms, which consume oxygen and produce heat. Once most of the organics have been metabolized, the temperature of the composting mass starts to drop. In the accelerated aerobic process, this stabilization begins to occur after approximately 7 days. The typical retention time in the Wright system is 14 days. Material can then be removed and further ‘curing’ can be done.

Of the six campuses using an Earth Tub, questionnaire responses were received from five institutions. Three of the five are currently using Earth Tubs in an outdoor environment. The University of Montana had been using Earth Tubs but had exceeded the vessels’ capacity and is now using other means of composting. Green Mountain, Vermont had also been using Earth Tubs but is no longer, due to constant freezing of the tubs. Northland suggests using a different product; they themselves are researching other products since their Earth Tubs needs repair three to four times a year. Three of the five were composting both pre and post consumer food waste. Approximately 40 pounds to 200 pounds of material was added to the Tub daily, depending on number of meals served. Three of the five campuses used two tubs to accommodate the ‘down time’ needed for the 14 day in-tub curing process. There was one report of biodegradable serving ware being used, which is incorporated into the compost. Three campuses had
gone completely tray-less. Cost savings reported were minimal, and based on savings from transportation costs or landfill fees. Staffing was done in four out of five instances by university personnel. Students are employed in different capacities at different locations. In one location students worked directly with the composting machinery; in another location the students worked at collecting and sorting pre and post consumer waste materials.

Of the remaining 27 campuses, five reported use of biodegradable food packaging and service ware\textsuperscript{8}, primarily due to the need for combining pre-and post-consumer waste prior to composting. Only one campus, Grand Valley State University, Michigan, reported going tray-less. This information was gleaned from campus websites, and may not contain all relevant information regarding the use of biodegradable serving ware or tray-less policies.

Alaska Pacific University transports all of its pre-consumer food waste to its farm in Palmer during the summer. There, it is composted in a traditional farming manner, outdoors, in windrows. Dining Services eliminated the use of trays in 2007 and for the 100 students they serve daily, they have reduced their food waste stream by 40 pounds each day. They had attempted to compost post consumer food waste but were met with indifference from many of the students, and they returned to composting only pre-consumer food waste\textsuperscript{9}.

\textit{Food services vendor at UAA}

The UAA Commons is the only kitchen on campus and the majority of food preparation is done there, and run by vendor NANA management services, whose parent
company is Sodexho. Sodexho is a national university food service vendor with a reputation for encouraging sustainable food practices. The Commons provides food service to both Creekside Dining and Cuddy Center. Creekside Dining serves approximately 3,700 meals per week, and the Cuddy Center serves approximately 3,100 meals per week. Only 250 meals per week are produced and served on biodegradable dishware, which adds $.50 to each meal. This additional cost has not been acceptable to students and therefore, standard ceramic dishware is still used, which is more sustainable than plastic, disposable, serving ware. As of October, 2008 the Commons kitchen generated about 9 cubic feet of pre-consumer waste a day (weight had not been determined, but if estimated at 1 cubic foot equals 10 pounds, 90 pounds per day), with pick up being done 6 days out of 7 by Anchorage Waste. The cost of having this food waste picked up by Anchorage Waste is borne by NANA Management. It is estimated that to save any money on waste transportation, at least 4.5 cubic feet of waste would have to be diverted to a composting process.

The staff at UAA Dining has experimented with tray-less dining. They had one day of tray-less service and realized a savings of 120 gallons of water, and related energy costs, which would have been used to wash the trays. There were some disgruntled students, but most responded in a positive manner to this new serving method. There will be additional tray-less days in the future. The intention is to go completely tray-less once students are more accepting of the concept. As reported by other institutions, there was an approximate reduction in food waste of 25% to 30%. (Note: Spring semester, 2009, UAA Commons went completely tray-less.)
Management policy options

To recap: Of the 32 U.S. and Canadian colleges and universities surveyed, there were campuses composting off site and on site. Those composting off site were either associated with a farm, or used a compost contractor or municipal composting facility. The campuses composting on-site used one of three methods. If small quantities were being composted, or there was an agricultural based curriculum, open site, on ground, composting was used. If moderate quantities of food waste were being composted, the Earth Tub was being used. This system can accommodate up to 200 pounds of waste daily. Large quantities of pre- and post-consumer waste combined were being composted in a Wright system. This system can accommodate up to 10 tons of food waste daily.

Anchorage, Alaska currently has no commercial composting facility and the Municipality of Anchorage is not currently contemplating a composting facility of any size\textsuperscript{11}. There was a composting facility at Pt. Woronzof for a number of years, under the auspices of the Municipality of Anchorage, composting only landscaping and building materials, but it has been closed and there are no prospects of seeing it reopen. A pilot project conducted at this site for food waste, several years ago, was closed down due to odor and sanitary issues. The contractor which picks up UAA waste, Anchorage Waste\textsuperscript{12}, in Fall, 2008 was looking at composting food waste but only in a limited manner, using restaurants as their target market. In April, 2009 AK Waste has purchased an in-vessel system – the first in the state – and once the equipment is installed, will use it to compost
only produce from Fred Meyers stores. UAA is approximately 50 miles from the closest farm. Therefore, these three composting options that are being utilized by other campuses are not currently available to UAA.

Composting in the open on campus, while done for landscape materials, is not feasible for food waste due to leaching and ground water contamination possibilities, a short summer season, and the possibility of drawing bears onto the campus.

NANA Management Services (NMS) is an independent dining services vendor, imbedded at UAA, and responsible for the disposal of food waste generated by UAA students. By contract, NMS is responsible for the cost of food waste disposal. Currently, that food waste is transported to the Anchorage landfill.

This leaves only two possibilities for composting at UAA: Either composting on campus with a small system such as the Earth Tub, or off campus with a large system such as the Wright system.

Option 1:

A composting project, for UAA only, would require a partnership between UAA and NMS, and utilize two Earth Tubs, based upon the amount of food waste generated daily and the cycle of adding material and then letting the material ‘stand’ for a period of time. The estimated cost for this project, based upon the University of Montana’s project as outlined in their 2004 report, and current estimates of cost from the manufacturer, would be approximately $46,050. The dollar savings would be minimal from such a project: Approximately $500 annually in savings from tipping fees and $500 annually by
providing the UAA grounds department compost for landscaping purposes. After initial equipment and installation costs were incurred in year one, on-going expenses would be limited to (assumed) student labor for loading and emptying the vessel, and electricity costs. These costs would appear to be offset completely by the small amount of savings each year.

This project would require an arrangement between NMS and UAA to use UAA land, near the Commons kitchen, to install two Earth Tubs. Close proximity to the kitchens is necessary for ease of movement of food waste from kitchen to tub.

Recommendations by several survey responses encouraged an indoor situation for these vessels with an ambient temperature of at least 50 degrees. Anchorage’s winter duration is estimated at about two months longer than any of the campuses surveyed; this extension of winter season would add support to the need for an indoor site of the vessels. This would require a dedicated indoor space for two tubs; the cost of retrofitting existing space is estimated in the cost estimate, and depending upon the site actually chosen to retrofit, the estimated expenditure in the cost estimate may not be valid. There are two loading bays on the east side of the Commons kitchen, contiguous to the kitchen, which might be retrofitted to hold two working tubs. This location would also accommodate off-loading the tubs’ completed compost into vehicles for delivery to a holding site. This site would also provide for the necessary electrical connectivity, drainage connections, and reasonable access to water.

One campus surveyed, which used Earth Tubs, indicated that the cost of the tubs was covered, in part, through an Environmental Protection Agency (EPA) grant\textsuperscript{14}. UAA
has received, and successfully completed five EPA grants over the last five years. It is reasonable to believe that based on past performance UAA would be in a good position to acquire some funding from EPA for such an undertaking. The University of Missoula set up their project as a pilot project, which allowed them to operate without strict adherence to regulatory oversight, under the auspices of their EPA grant.

UAA facility personnel could be used for installation and maintenance; based on their re-charge nature, some department would absorb the cost. NMS might consider using student labor to transport the daily food waste to the receptacle, as part of the student’s employment contract. The University of Montana project report (DeLuca, 2004) suggests that a university staff member be responsible for the oversight of the composting operation to assure proper use of the equipment and perform maintenance when required.

Bulking material, which is added to the food waste to provide the nitrogen needed for the biological process as well as absorbing excess moisture, would be needed. A source of such bulking material might be had on campus in the form of used paper towels from washrooms. The preferred material would be wood shavings or chips, or sawdust. However, in Anchorage, the only sawmill that might have provided this material, has moved to the Mat-Su Valley.

Option 2:

This option would be a partnership among the U-Med District participants which includes: University of Alaska Anchorage, Providence Alaska Medical Center, Alaska
Pacific University, Anchorage School District, Southcentral Foundation, Alaska Native Tribal Health Consortium, Green Star, Inc., and Alaska Psychiatric Institute, to undertake a sizable investment in a much larger (Wright, for instance) in-vessel system, capable of composting up to 10 tons of pre-and post-consumer waste daily. This option would entail the dedication of centralized land for a site, dedication of personnel for operation, and a substantial capital investment. The U-Med district is currently in the process of determining all the information and data required to do a business plan for assessment of economically feasible methods of waste reduction. This is estimated to be a one year project.\textsuperscript{15}
**Conclusion/recommendation for action**

To begin to cope with the fundamental changes in human behavior that will be required to re-direct the Earth’s consciousness towards sustainability, it is necessary to create new models of behavior and a new set of values.

This project represents an opportunity for UAA to make a change in its own behavior, to set new values for the UAA community, and to make a large stride forward in keeping the commitments it made when it signed the Talloires Declaration to introduce sustainable practices, and the American College and University Presidents Climate Commitment to reduce its carbon footprint. It also allows the institution an opportunity to strategically position itself by talking and walking on the ethical high ground.

Social and environmental values are not represented in market prices that directly affect management decision making. When making sustainable business decisions, these additional values, such as the reduction of CO\textsubscript{2} and methane, must be taken into consideration. Taking these values into consideration can reduce the payback period considerably, and add value to seemingly small cost reductions derived from high-cost investments. **Strong energy programs and strong recycling programs are prerequisites to credible campus environmental programs in general.**

The U-Med District has undertaken a year-long assessment project to determine all the information and data necessary to make a determination about solid waste reduction methods. When this assessment project is completed, there should be a substantial body of additional information on the viability of larger in-vessel systems from AK Waste, based on their pilot project which will begin in May, 2009. At that point
in time, UAA may opt to join the U-Med in a large composting system, if that is the U-Med’s determination in a year’s time.

For these reasons, my recommendation is to engage in a composting project on the UAA campus. This project is small enough that it could be undertaken in a relatively short period of time and substantially reduce the amount of food waste UAA is currently sending to the municipal landfill. The University is in a unique position of modeling behavior, in a highly visible manner, beneficial not only to its staff and employees, but more importantly, to its students and the surrounding community, by establishing an on-site composting project.
Appendices

Appendix A: Talloires Declaration

Appendix B: Carnegie Peer listing

Appendix C: Survey Instrument

Appendix D: Modified Survey Instrument

Appendix E: Food Waste Composting Demonstration Project, University of Montana – Dining Services, April 2004

Appendix F: Earth Tub information, including price and shipping

Appendix G: Wright information
Tables

.1 Matrix of 32 campuses surveyed

.2 Matrix of survey responses
References

American College and University Presidents' Climate Commitment. AASCU's Division of Government Relations and Policy Analysis (June 2008). Retrieved September 10, 2008 at
http://www.aascu.org/media/pm/pdf/pmjune08.pdf


Municipality of Anchorage, Anchorage Assembly. Minutes for regular meeting, May 6, 2008


Endnotes

2 UK Carbon Trust, 2008

3 The consensus in 1970, scientifically, was there would be ‘global cooling.’ But subsequent review of the scientific articles of those days actually predicted the opposite, global warming. See endnote ‘Peterson, T.C., et al’

4 This is an assumption on the part of the author. Numerous independent food vendors on campus also produce pre-consumer food waste that is disposed of through traditional methods.

5 Most recent Report Card available September, 2008.

6 A national study by ARAMARK found that the quantity of food waste was reduced by 1.2 to 1.8 ounces per person per meal in dining facilities that eliminate trays: a 25% to 30% reduction in food waste per person.

7 Ft. Lewis College, Colorado, Northland in Wisconsin, Bowdoin in Maine, and Colorado College, Colorado, all operate Earth Tubs twelve months of the year in outdoor environments.

8 Bowdoin College, Maine; Carleton College, Minnesota; University of Washington; University of Manitoba; and, Grand Valley State University, Michigan

9 Matthew Stevens, Director of APU Food Service, personal communication, September 21, 2008.

10 Lisa Von Fumetti, General Manager, UAA Seawolf Dining, and Heath Franklin, personal communication, November 7, 2008.

11 Donna Mears, Municipality of Anchorage, personal communication, November 14, 2008

12 Katy Suddok, Alaska Waste, personal communication, November 15, 2008

13 DeLuca Report, University of Montana, Missoula, April, 2004, Appendix E.

14 University of Montana, Missoula

15 Jeanne Carlson, Recycling Coordinator, Municipality of Anchorage