

# Michigan Tech Environmental Sustainability Committee Vision Fund Full Proposal

**Project Title:** Greening Michigan Tech – Environmental Sustainability in Campus Operations and Activities

**Proposal Summary:** The three goals of this project are (1) to implement recycling and conservation projects that are immediately feasible and to expand such activities over the coming years; (2) to educate the campus community and to facilitate community participation in efforts to reduce the environmental footprint of MTU; and (3) to inculcate an environmental awareness into the daily fabric of operations at MTU such that we can become a role model for environmentally sustainable campuses and environmental education. We propose a tiered set of activities to reach these goals. Efforts toward the first goal will include reestablishment of a campus-wide paper recycling program, purchase of recycled materials, waste reduction, and energy conservation. In the process, we will develop a revenue stream via savings and profits generated by some of the sustainable activities. To reach the second goal, we will promote education about environmental initiatives through all of the campus media, educate students through senior design classes focused on “green” designs for existing and new buildings, and provide incentives for a larger group of students, faculty, and staff to participate in core sustainable activities. These incentives will include recognition of individuals and groups for environmental improvements, and cash rewards (using revenue gained above) for winners of "environmental improvement" contests. To reach the final goal, it will be necessary to designate an environmental coordinator for the campus. This coordinator can then not only maintain the programs initiated under this project, but also work with individual campus units over time to identify the most significant environmental improvements that each unit can make.

By developing and implementing sustainable practices, activities, and technologies, Michigan Tech will be recognized as an example for other universities and communities. If we fail to do this, we will be known as a university that has fallen behind in matters of environmental sustainability. According to the National Wildlife Federation survey, over 90% of universities have *already* developed university-supported recycling programs, among other initiatives. This is an opportunity for us not only to support the moral imperative, but also to join the leaders in promoting environmental sustainability.

**Participants:** MTU Environmental Sustainability Committee (ESC) appointed by President Curtis J. Tompkins

Mike Abbott, Auxiliary Services; Jill Bachelor, Occupational Safety and Health Services; Bethany Baibak, Student, Biological Sciences/Ecology; Brad Baltensperger, Social Sciences/Education; Nicole Bloom, Student, Environmental Engineering; Kristine Bradof, GEM Center for Science and Environmental Outreach; Sarah Culver, Student, Applied Ecology and Environmental Science; Kyra Fillmore, Graduate Student, Biological Sciences; Jason Grubb, Student, Geological Engineering; Jim Heikkinen, Facilities Management; Matt Manders, Student, Applied Ecology and Environmental Science; Marcel Potvin, Graduate Student, Forestry; Bruce Rafert, Graduate School; Jamie Sheahan, Student, Applied Ecology and Environmental Science; Shalini Suryanarayana, Committee Chair, Educational Opportunity; Noel Urban, Civil & Environmental Engineering

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**Signature of Project Leader:** \_\_\_\_\_ **Date:** \_\_\_\_\_

## **1. Vision, Mission, Goals, and Support of the Action Agenda.**

The vision for Michigan Tech is to become a university of choice. Prospective students are becoming increasingly sophisticated in their choice of university; they seek an institution with high quality programs, a vibrant and fulfilling lifestyle, a caring and motivated faculty, and a campus whose values match their own. More and more frequently, students are finding sustainability and environmental themes to be of increasing importance.

Recent surveys document the importance of environmental affairs to students. The National Association of College & University Food Services (NACUFS) Environmental Awareness Survey indicates that 51% of all students regard their personal convictions about the environment as being very important, and 57% of students regard recycling on campus to be very important.

The importance of universities playing a leading role as centers of environmental awareness was well stated in a recent publication by the National Wildlife Federation (NWF). According to a survey by the NWF that generated 1,116 responses from presidents, provosts, and chiefs of administration and operations at 891 of the nation's 4,100 colleges and universities (22 % of schools, including Michigan Tech):

To glimpse the future, there is no better point than in the nation's colleges and universities. With more than 14 million young people enrolled each year, the values instilled there set the course for succeeding generations not just in the United States, but all across the world. With roads, buildings, fleets of vehicles, labs, offices, residences, and stadiums, colleges and universities are microcosms of society. As such, they provide unique learning laboratories in which students may gain knowledge, tools and practical experience necessary to strike the balance between human health and sustaining the health of our environment. In the process, campuses innovate and apply new practices and technologies that prevent pollution and waste, serving as models of a green future for other institutions.

The same survey went on to point out that nationally, 92.3% of schools recycle white paper, 89.7% cardboard, 73.5% aluminum cans (as well as various other materials). With the exception of isolated individuals on campus, Michigan Tech is currently engaged in exactly none of these activities. Our lack of a campus-wide recycling program represents a potentially large disconnect between the expectations of our students and our self-portrayal as a rural institution with a variety of environmental academic programs seeking to become a national university of choice.

Although this proposal is submitted under the aegis of the Campus Environment category of the Action Plan, the goals of sustainability and environmental awareness are embodied within the Mission and Vision of Michigan Tech, as well as in all eight of the Strategic Goals.

**Impact:** The Greening MTU Program will be a significant step toward Michigan Tech's (1) being recognized as leading the university and local community toward achieving environmental sustainability; (2) becoming increasingly attractive to growing numbers of students, faculty, and staff who are concerned about sustainability; and (3) realizing reduced costs in areas such as waste disposal and energy used in heating and lighting. This project will introduce an enduring, comprehensive, campus-wide environmental sustainability program that will begin to establish Michigan Tech as a leader in these areas—areas that closely match many of our strongest academic programs and our major geographical assets. The development of facilities necessary for sustainable activities will require updating the physical resources of the University to levels comparable to those at universities with established and successful programs.

As Michigan Tech puts greater emphasis on environmental sustainability and develops a reputation for doing so, it will gain increased recognition from industry, other universities, and potential students. The incorporation of these ideas throughout Michigan Tech will improve the learning environment by stimulating us (students, faculty, staff) to think about our actions, whether throwing “waste” in the recycling bin or attending classes in energy efficient buildings. *Active* participation in all phases of the project—from recycling to reduced consumption to purchasing recycled products—will foster shared ownership of the program and will ensure these objectives are met. This emphasis will also be particularly important if the University’s Sustainable Futures STC proposal (NSF) is funded.

Embedding sustainability as a primary concern in the everyday workings of the university will also help prepare students to create the future responsibly. Efforts to live and learn with these principles in mind will give our students, educators, staff, and community a broader perspective. These efforts will also promote a greater sense of individual responsibility to identify, support, and practice environmentally sustainable choices. These initiatives hold promise for fostering a stronger connection between students, faculty, staff and the university, building a greater sense of community, and even improving recruitment and retention.

Finally, by developing and implementing sustainable practices, activities, and technologies, Michigan Tech will be recognized as an example in these contexts. If we fail to do this, we will be known as a university that has fallen behind in matters of environmental sustainability (per the NWF survey, over 90% of universities have already developed university-supported recycling programs, among other initiatives). This is an opportunity for us not only to support the moral imperative, but also to join the leaders in promoting environmentally sustainable activities.

## **2. Major Efforts.**

The three goals of this project are (1) to implement recycling and conservation projects that are immediately feasible and to expand such activities over the coming years; (2) to educate the campus community and to facilitate community participation in efforts to reduce the environmental footprint of MTU; and (3) to inculcate an environmental awareness into the daily fabric of operations at MTU such that we can become a role model for environmentally sustainable campuses and environmental education. We propose a tiered set of activities to reach these goals. Efforts toward the first goal will include reestablishment of a campus-wide paper recycling program, purchase of recycled materials, waste reduction, and energy conservation. In the process, we will develop a revenue stream via savings and profits generated by some of the sustainable activities (note that these savings may *initially* be offset by other activity costs). To reach the second goal, we will promote education about environmental initiatives through all of the campus media, educate students through senior design classes focused on “green” designs for existing and new buildings, and provide incentives for a larger group of students, faculty, and staff to participate in core sustainable activities. These incentives will include recognition of individuals and groups for environmental improvements, and cash rewards (using revenue gained above) for winners of “environmental improvement” contests. To reach the final goal, it will be necessary to designate an environmental coordinator for the campus. This coordinator can then not only maintain the programs initiated under this project, but also work with individual campus

units over time to identify the most significant environmental improvements that each unit can make.

It is instructive to compare our major goals to those activities articulated by the recent NWF survey (tabulated below). Our identification of recycling, savings through solid waste reduction, and energy conservation as initial targets is in line with activities at other campuses. Our assessment that staffing will be needed and that public orientation and education are important also is supported by this survey.

**Table 1. Overview of Key Findings from NWF Report**

Category	Comments/Findings
ACTIVITIES:	
Strongest campus environmental program	Recycling
Most likely focus areas for campuses	Reducing solid waste
Most popular energy strategy	Lighting retrofits
Most popular landscaping strategy	Integrated pest management
Most popular transportation strategy	Bike racks
New frontiers	Purchasing organic foods and chlorine-free paper, life-cycle assessment, and ecological building design
Surprising effort despite the odds	Renewable energy
STAFFING & MANAGEMENT	
Areas most likely to be staffed	Recycling and energy
Most prevalent management strategy	Setting and reviewing goals
Biggest opportunity missed	Orienting students, faculty and staff
PHILOSOPHICAL	
Strongest motivation for improving environmental performance	Ensuring actions are consistent with the values and culture of the campus
Biggest surprise	Number of campuses requiring students to take an environmental course
Area where most improvement is needed	Ensuring graduates, regardless of major, are environmentally aware and literate

Michigan Tech does quietly recycle scrap metal, used motor oil, fluorescent light tubes, computer components, Ni-Cd batteries and car batteries. However, Michigan Tech disposes of many highly visible recyclable materials such as office paper, cardboard, tin cans, packing peanuts, and glass. The ESC proposes a layered plan to reintroduce the recycling of paper and/or cardboard first, and then gradually to expand to include other recyclable materials as we are able. Recycling programs are effective only if participation is high; educational outreach to the campus community will be needed to attain high recycling rates. Recycling alone will help to make MTU a college of choice, but it will not move MTU to the forefront of environmentally friendly and sustainable campuses. Institutionalized efforts to analyze university policies (e.g., energy utilization, purchasing policies, choice of auto fleet vehicles) in order to assess and minimize our ecological footprint would make us a leader in these fields.

Goal 1. In year one of this project, the ESC will reinstate recycling of paper and expand to cardboard recycling. Paper and cardboard comprise a major portion of the solid waste generated on campus. A waste audit conducted in 1997 documented that recyclable paper products comprised 40% (now equal to 40 tons per month) and cardboard 5% of the solid waste at MTU. Detailed waste audits of the Dow Building conducted each of the past three years also found that recyclable paper comprised 43% and cardboard 9% of the waste generated in this building. Both office paper and cardboard are marketable, but a baler will be required for cardboard recycling (see details below). Based on the previous record at MTU and that from other universities, achievement of a recycling rate of 50% of the potential paper pool within a year (i.e., recycling of 20 tons per month) and a similar percentage for cardboard recycling one year later (i.e., 2.5 tons per month) are ambitious but attainable goals that will yield a savings to the University of \$1,240 per month.

Goal 2. Year-one efforts towards campus community education will follow two channels. Campus media (the Lode, Tech Topics, radio stations, ETS, all-campus e-mail) will publicize recycling activities and progress towards achieving our recycling rate goal. We will also mobilize student groups (SCB, SAVE, SEEn, MWEA, SWE, ASCE, etc.) to spread word to their peers and to find the most convenient collection points for paper in each building.

Once the infrastructure is developed for the paper and cardboard recycling program, in year two we intend to expand our recycling program to other materials and to evaluate other sustainable activities. The distance of many markets makes recycling of some materials uneconomical. We will encourage innovative techniques and engage only in activities that are economically and environmentally advantageous. One innovative program to reuse packing peanuts, started by students from Society for Environmental Engineering (SEEn), is currently run by the Phi Sigma Biological National Honor Society. This program collects packaging peanuts and delivers them to The Shipping Shop in Houghton. The ESC is helping Phi Sigma to expand the program to the entire Dow Building; with the help of other student groups, we expect to expand the program to much of the campus. Other sustainable activities include evaluating purchasing policies (e.g., recycled paper, bleached vs. unbleached towels and napkins, printers and copiers capable of using recycled paper, fuel-efficient vehicle fleet), and ways to minimize energy consumption (energy audits, lighting surveys), and resource use (e.g., card readers to track paper usage as in MEEM computer labs).

Goal 3. In order for these activities to outlive this Vision Fund Project, they must be both economically sustaining *and* institutionalized within the existing MTU operations. As detailed below, the paper and cardboard recycling will be run by custodial and grounds staff; because the operations are being planned by these personnel, we are confident that additional time and financial commitments will be minimal. Revenues from these activities should greatly exceed the small costs. We intend to pursue subsequent activities in a similar fashion. For larger issues (e.g., design of new “green” buildings), faculty may use senior design projects to gather information needed by university administrators or staff to make informed decisions. For smaller issues, student organizations may work with university staff to evaluate environmental costs and benefits; students can help the staff gather information needed to make informed decisions. Clearly, only if the staff is part of the decision process will they believe in the selected alternative and implement it with enthusiasm. If the funds generated through recycling can be

used to reward environmental improvements, an atmosphere may be established in which all MTU staff and administration automatically incorporate such environmental evaluations into their decisions. At that point, MTU will become a leader in “campus ecology.”

As cited in the NWF survey above, other universities have found it essential to designate an environmental coordinator. Fifty-one percent of campuses have recycling coordinators. Precedents exist for other types of staffing as well; for instance, 36 % of campuses have energy conservation coordinators, 21 % report having a full-time administrator on the staff who manages environmental issues beyond regulatory compliance, and another 7 % have green purchasing coordinators. The environmental coordinator need not be a new position; many existing staff on campus would be fully qualified to serve in such capacity. It is essential to make room for and to include within someone’s job description the responsibility for overseeing the recycling operations, coordinating volunteer environmental activities of student groups, maintaining public awareness of environmental activities, organizing contests for campus “greening,” and promoting the image of MTU as **the** choice for environmentally conscious students. Accordingly, we propose to begin in year two of this project to designate a portion of the revenues from recycling for the salary of a staff environmental coordinator. The dependence of this person’s salary on the success of her/his efforts will be good motivation.

### **3. Recruitment and Retention.**

Michigan Tech’s location in a spectacular environment, part of our desired national image, aligns well with a program of campus recycling and sustainability. We are obliged to do more from an environmental perspective than is expected from ordinary citizens; we need to match the rhetoric associated with our promotional materials. Our recruiting advertisements tout us as a *leader* in environmental science and education. Now, we need to walk the talk.

We also need to market/publicize what we do and ensure that we receive credit for our efforts. One simple example would be to use recycled materials for our brochures, applications, and recruiting materials, and then make sure this is acknowledged. Electronic web applications should be noted as “reducing environmental load.” Our strategy to minimize our *ecological footprint* should be prominently featured in all possible venues.

The latest NACUFS survey found that 81% of colleges and universities report that meeting the environmental awareness of their students is *important* or *very important*. Failure to do so puts us at a competitive disadvantage in terms of both recruitment and retention. One of the biggest reasons students cite for leaving a college or university for another is a lack of involvement or connection with the campus community. Engaging students in the activities described here can be another hook that keeps them connected to Michigan Tech. Student leadership skills are enhanced by participation in environmental projects. University membership in organizations such as the U.S. Green Building Council, Paper Recycling Coalition, and College and University Recycling Council will give students more business and academic environmental contacts. They will also benefit from the opportunity to engage in professional development opportunities such as environmental and energy audits. Retention can be increased by all of these initiatives. Such activities on a resume can give graduating students a unique advantage over the competition for highly sought jobs. Participants will take valuable experience to their new jobs. For example, the

Ford Motor Company Fund has provided dollars expressly to encourage greater environmental awareness among Michigan Tech students, whom they view as future employees.

As is stated best in the NWF Report,

It is more important than ever before that students graduate with the tools and knowledge needed to strike the balance for people and nature when they are called upon to make those decisions in the workplace, at school and at home. Colleges and universities provide unique opportunities for students to gain crucial skills through what is taught and practiced, both within the classroom and through the management and operations of the campus. Despite all of the encouraging precedent in higher education, much work clearly remains to be done in innovating and demonstrating the greener practices needed for society. This survey should be seen as a baseline from which to encourage and measure future progress. It is also intended to spark healthy debate within higher education about environmental sustainability and how best to achieve it at campuses and beyond.

Current enrollment statistics suggest that an “environmentally friendly” campus will aid in the recruitment and retention of women. Nationwide and at MTU, women are better represented in engineering disciplines that have inherent ethical connotations, such as environmental engineering. At the undergraduate level, women comprise more than 50% of the environmental engineering students at MTU, a percentage much higher than the average for the College of Engineering. The image of an environmentally aware and friendly campus will almost certainly help to recruit and retain these highly motivated and socially concerned citizens.

#### **4. Organization and Management.**

Upon the inception of our committee during the summer 2001, President Tompkins directed us to initiate a campus-wide recycling program by January 2002, and to develop a white paper on other environmental sustainability issues by May of 2002. In response, we formed the Michigan Tech Environmental Sustainability Committee (ESC), with membership from all sectors of the university. To date, our focus has been on identifying issues and planning the logistics for the reestablishment of a university-wide paper recycling program.

The committee structure and current committee chairs of the ESC are summarized in Table 2 below. The ESC Chair, Shalini Suryanarayana, will hold primary responsibility for project management, assessment, and resource allocation. The following subcommittees (with chairs identified) hold specific functional responsibilities.

**Table 2. Environmental Sustainability Committee Responsibilities by Subcommittee**

<b>Subcommittee</b>	<b>Faculty/Staff Co-Chair(s)</b>	<b>Student Co-Chair</b>	<b>Responsibility</b>
Storage/Facilities	Jim Heikkinen, Jill Bachelor	Jamie Sheahan	Movement and Storage of Recyclables
Education/PR	Brad Baltensperger	Sarah Culver	Awareness; Education
Contact with Industry	Kristine Bradof	Nicole Bloom	Contract Negotiation for Recycling
Finance & Cost-Benefit Analysis	Bruce Rafert, Mike Abbott	Marcel Potvin	Fund/Accounting; Fundraising
Environmental Management Issues	Jill Bachelor	Nicole Bloom	Info Gathering; Generate Recommendations
Equipment Acquisition	Shalini Suryanarayana	Kyra Fillmore	Baler/Equipment Purchase
Green Buildings	Jim Heikkinen	Matt Manders	Input for New Buildings

Through year one of this project, we envision the activities and membership of this group being driven by volunteer (non-remunerated) personnel, including students, faculty, and staff. Because our long-term goal is to incorporate environmental consciousness into the fabric of MTU's daily operations, each "sustainable activity" that we implement will utilize existing staff, student organizations, and, to the extent possible, facilities. Our plans for recycling of paper and cardboard (detailed below) illustrate this approach. As the scope of our activities increases and the revenue stream grows (year two), we plan to fund a part time program coordinator, as is the model at other institutions, or at least to contribute funds to add these duties to an existing position. As highlighted above (section 2), we will achieve our long-term goals through an innovative combination of a program coordinator (motivated to produce her/his own salary), student organizations, faculty involved in senior design (or communications) projects, an ongoing public awareness campaign, and public recognition and monetary rewards for improvements in campus sustainability.

The importance of the environmental coordinator's position cannot be overstressed. Given that this position can be funded with revenues from recycling activities (possibly supplemented with grants), establishment of such a position promises tremendous returns without any commitment of existing resources. To become a leader in campus sustainability issues and to become an environmental campus of choice, we believe that MTU must establish an environmental coordinator position.

### 5. Performance Assessment.

The following measurements of progress will be used to gauge the success of the program in achieving our seven major goals that are cited below.

**Table 3 – Goals and Indicator(s) of Progress**

Goal	Indicator(s) of Progress
1. Reduction of waste stream(s)	Amounts recycled and/or reductions in purchasing of paper, aluminum cans, packing peanuts, plastic, cardboard, chemicals, reduction in waste removal tonnages as compared to previous years
2. Reduction of energy costs	Energy audits/each building
3. Increased student satisfaction with campus experience	Survey; contest participation
4. Increased percentage of campus community involved directly with sustainable activities	Survey; contest participation, percentage of waste stream being recycled
5. National recognition for MTU	Inclusion on lists such as those produced by NWF and NACUFS in which positive actions are cited; listed as "environmentally friendly" in guides such as Peterson's
6. Involvement by local government or community groups	Participation by Cities of Houghton and Hancock; add-on recycling programs, participation on ESC Advisory Board
7. Establishment of a revenue stream from recycling and grant activity	Dollars saved/generated from recycling activities

External evaluation will be performed annually by the ESC Advisory Board. This group will have membership as follows: two members from staff who work with environmental management planning, two members external to MTU (e.g., a representative from the National Wildlife Federation or from an institution with well established programs such as Northland

College); two faculty/staff members from MTU; and two student members (e.g., USG, GSC). The Board, carefully selected for expertise and objectivity, will prepare a report that addresses progress toward each of the seven major objectives cited above.

## **6. Recent Experience.**

MTU has previously demonstrated success in implementing two campus-wide recycling programs (both involved paper) as well as a current pilot program initiated by student groups that also focuses on paper. Although both programs ceased during periods of adverse recycling market conditions (collector/transporter's 10-year grant from the State of Michigan ran out), many lessons were learned and those who were centrally involved are still here to provide input.

The ESC has tremendous experience in the area of recycling. Committee members Mike Abbott and Kristine Bradof were active leaders in past efforts. In addition to this kind of institutional memory, some student members, such as Kyra Fillmore (graduate student in biology; from GVSU) worked on recycling programs at their former institutions. Other MTU personnel who serve on the committee have extensive experience in the areas of facilities (Jim Heikkinen), federal safety regulations (Jill Bachelor), outreach and education (Brad Baltensperger, Shalini Suryanarayana), and administrative mechanisms (Bruce Rafert), just to name a few.

Several MTU faculty and staff have also volunteered to assist in these efforts, including J. Mihelcic (whose classes have conducted energy/waste audits and surveys), R. Hiltunen (dining services), B. Wagner (residence halls and RAs), P. Radecki (corporate services), S. Olsson (alumni relations), R. Wenc (Daniel Heights), S. Matthews (writing center; international students), S. Kauppi (Affirmative Programs), S. Green (KITES project), J. Glime (biology), V. Troesch (lawyer; perspectives instructor), J. Chadde (Western U.P. Center for Science, Mathematics, and Environmental Education), and others.

This extensive experience and widespread support will serve as a foundation for us to launch a strategic program that recognizes the need for continuity and alignment with MTU's major institutional objectives. We will take advantage of existing efforts and build an infrastructure that supports program activities across the entire campus.

Michigan Tech is involved in several types of recycling, such as some metals (most notably steel), fluorescent light tubes, computers and electronics, rechargeable batteries, mineral based lubricants and oils, and mercury (from time to time). Niemi has both experience and insight into these areas and is serving as a consultant to our committee. In addition, his colleague, J. Bachelor, serves as a member of the ESC.

Student groups have shown initiative and demonstrated success in their current recycling efforts. Phi Sigma is recycling packaging peanuts. They started on the 7th floor of the Dow Building and are planning to expand to the rest of the Dow first, then to other parts of campus. Other student groups, in addition to our committee, will assist the expansion. Both SAVE (Students Against Violating the Environment) and SCB (Society for Conservation Biology) were responsible for our current *pilot* project in paper recycling. They have been collecting recyclable paper at specific locations around campus and working with another local organization, Copper Country Mental Health, for pick-up and delivery to Smurfit Stone on a small-scale temporary basis.

Individual staff members also have exhibited considerable initiative in implementing recycling on their own; J. Hainault has organized recycling of cardboard from the Memorial Union Building, and T. Collette orchestrates a similar effort for Central Stores. These efforts will facilitate our campus-wide recycling of cardboard once a baler is obtained.

Our committee has also consulted D. Taivalkoski with regard to energy conservation. His efforts in this arena have been ongoing for the past 20 years. He has submitted a series of articles to be printed in Tech Topics outlining ways in which we can all work together to help conserve energy. Taivalkoski has a wealth of ideas and is also willing to work with the ESC.

### **7. Existing Facilities and Equipment.**

To emphasize that it is possible to institute sustainable activities that a) utilize existing staff and facilities, b) involve all responsible parties in the planning process, and c) generate revenue, we highlight briefly here our plans for paper recycling. An extensive waste audit conducted in 1997 as a senior design project led by J. Mihelcic (CEE) documented that recyclable paper constitutes about 40% of MTU's waste stream. We have confirmed with W. McKilligan (Facilities Operations Mgr) that the total MTU waste stream is now 1300 tons per year; thus, the quantity of potentially recyclable paper is 520 tons per year or 43 tons per month. During the previous paper-recycling program at MTU (1994-1996), a recycling rate of ~30% was achieved. We believe that with campus-wide publicity and careful planning of convenient collection procedures, a recycling rate of 50% is achievable. Recycling of 50% of the 43 tons per month will save the university \$1,180 per month in tipping fees. We suggest that this savings be used to cover any expenses incurred for the recycling program as well as being passed back to the independent units that pay for their own garbage collection (e.g., residence halls, MUB, SDC, etc.). Such a distribution of funds will provide incentive to the individual units to reduce their waste streams.

After comparison of potential markets, we have selected Manistique Papers, Inc. (MPI) as the recommended buyer of our recycled paper. Manistique Papers accepts "mixed office waste paper," a category that includes most of MTU's waste paper and that results in the least danger of contamination with unacceptable materials. Manistique Papers appears to be an environmentally responsible company. They have curtailed use of chlorine bleaching, made recycled fibers a major part of their operations, and completed cleanup of the Superfund site in the Manistique River. This company will pay for shipping of the paper from MTU to Manistique, and will arrange for a trucking company to provide a trailer for our use to collect and store the paper until a full load is ready for shipping. The company has further volunteered to donate approximately 30 Gaylord boxes, a gift worth at least \$165. The current price paid for "mixed office waste paper" is at a five-year low of \$27 per ton; the recycling market is quite volatile, however, and prices as high as \$150 per ton have been paid within the past five years. Thus, the annual revenue (on top of the \$14,000 saved in tipping fees) from recycling 50% of our paper wastes will be in the range of \$7,000-\$39,000.

Recycling will be most successful if it is made a part of daily operations at MTU. Accordingly, we have asked W. Mitchell (Custodial Supervisor), A. Niemi (Grounds Operations Supervisor), and J. Bachelor (Occupational Safety and Health) to formulate a plan of operations. To date, they have [a] selected a location for parking the trailer for paper collection, [b] inventoried the

number of Gaylord boxes (11) and outside bins (3) needed for paper collection around campus, [c] identified the lowest cost source of Gaylord boxes (recurring cost of \$55 per month), [d] identified 100 collection centers within university buildings where paper recycling bins (total cost \$1400) will be placed, and [e] devised a plan for regular transfer of paper from collection bins in collection carts (total cost \$1000) to the Gaylord boxes or outside bins and subsequent transfer of full Gaylord boxes by Grounds personnel to the storage trailer. The committee has talked with S. Stackhouse in Corporate Services who has identified an existing source of funding for the collection bins and custodians' carts. The next step is to engage staff members from the auxiliary services (e.g., MUB, SDC, Daniell Heights, residence halls) in the planning so that these units also will participate. Toward this end, contact has already been made with J. Hainault (MUB Mgr) and B. Hiltunen (Dining Services). In short, we propose to have a system in place to begin collection and recycling of mixed office waste paper at the beginning of the spring semester. No funds are requested in this proposal to support the initial layout of the activity.

As discussed above, we propose to expand the recycling program to include cardboard within the coming year. Recycling of cardboard will necessitate purchase of a baler because no buyers currently accept unbaled cardboard. If markets do not change significantly in the interim, we propose to send cardboard to Manistique Papers together with the paper; this will simplify logistics. Manistique Papers currently pays \$25 per ton for baled cardboard and an additional \$10/ton for unbaled paper. The baler will eliminate the \$55 monthly expense for Gaylord boxes. In addition to the baler purchase (estimated cost \$25,000-\$50,000), it will be necessary to identify a location for the baler and to train a staff person in its operation. An operation plan for baling of cardboard and paper will be developed after the paper recycling operation is underway.

#### **8. Cost-Sharing Requirements/Pursuit Funding.**

No direct internal (MTU) support is requested in this funding cycle; the project activities are designed to be self-liquidating and will be supported entirely through external support and self-generated revenue. Members of the ESC will continue to devote their considerable time at no cost to the program. This contribution alone is conservatively valued at \$15,000 annually.

The start-up costs for the proposed recycling program are phased and include minimal immediate needs. During the initial phase of the program, we anticipate a cooperative effort with an industrial partner to launch the recycling portion of the program. The value of the service the partner will provide (in this case, Manistique Papers Inc.) is estimated at \$20,000 for the first year. As we progress into recycling infrastructure and energy conservation, we will need to acquire equipment and pay for installation (e.g., for a baler, replacement lighting systems). Personnel in Corporate Services are aware of this need, and have already begun to solicit potential donors. Once all programs are in place, they will require continued monitoring and improvement. In the future, we anticipate providing monetary support for a program coordinator and/or student coordinators to manage existing efforts, expand educational outreach and programming, and move Michigan Tech toward institutionalizing green technology.

We will coordinate closely with the Michigan Tech Fund to pursue funding opportunities. We envision working with Tech Fund personnel to seek support from: energy companies (e.g., DTE, Consumers' Power), environmentally conscious companies with whom Michigan Tech has established ties (e.g., Dow, GM, GE), various foundations (e.g., Dow, Ford, GM, Kellogg,

Wege, the Energy Foundation), and alumni with an interest in improving MTU's campus environment. Our finance subcommittee will work closely with Tech Fund personnel.

**Budget Explanation:** In keeping with the true interests of sustainability, the goals of our committee are long term. Three years of budget estimates are outlined, but our intent is to create a self-sustaining program that will continue at minimal cost to the General Fund. The first year budget is, for all practical purposes, cost neutral (see Table 4 below). A savings of \$14,000 per year will accrue to the waste disposal account of the university. We recommend that this be passed back to individual units to serve as an incentive for their active participation in recycling. The student worker will be hired either by ESC or the GEM Center for Science and Environmental Outreach to provide publicity and to insure that the recycling is progressing smoothly. Travel expenses are for an ESC member and student environmental group leaders to attend the annual convention of the Upper Peninsula Recycling Coalition and the NWF Campus Ecology Fair. Revenues for the paper have been conservatively estimated using the current price for paper. Funds for the necessary first year supplies have been awarded in a grant from the Ford Motor Company Fund.

**Table 4. Breakdown of first year budget.**

	<b>Cost</b>	<b>Income</b>	<b>Comments</b>
<b>Personnel: Students</b>	\$3,000	\$1,000 <sup>a</sup>	10 hr/wk to oversee and improve paper and packaging peanuts recycling, provide public service announcements
<b>Large equipment</b>			
<b>Supplies – single time purchases</b>	\$1,500 \$1,000 \$200 \$400	\$1,500 <sup>a</sup> \$1,000 <sup>a</sup> \$200 <sup>a</sup> \$400 <sup>a</sup>	Recycling bins Collection carts Signage Brochure/Flyer
<b>Recurrent supplies</b>	\$500	\$500 <sup>a</sup>	Gaylord boxes
<b>Operating expenses</b>		\$14,000	Reduced tipping fees
<b>Revenues</b>		\$52,750	Paper sales and energy savings
<b>Travel</b>	\$3,000	\$400 <sup>a</sup>	To allow ESC member to attend UP Recycling Convention, NWF Campus Ecology Fair
<b>TOTAL</b>	<b>\$9,600</b>	<b>\$71,750</b>	

*a. Dollars awarded by Ford Motor Company Fund.*

Because of market volatility, we have not made a detailed projection of income for years two and three. The majority of the requested support is for the campus environmental coordinator's salary and fringe benefits (year 2-1/3-time, year 3-1/2-time) and for capital equipment (recycling infrastructure including cardboard/paper baler in year 2, energy conservation devices in year 3), and minor equipment/supplies.

By launching the recycling program in cooperation with an industrial partner, we will keep initial costs low. With the partner providing approximately \$20,000 worth of equipment and services the first year, initial MTU expenses will be minimal. In addition, we intend to leverage web sites and newsletters to solicit equipment and material donations. Our Pursuit Plan (for travel expenses) has primary targets that include foundations (grant proposals written in conjunction with Tech Fund personnel), industry with which we have established relationships (sponsorships from major partner companies with sensitivity to environmental awareness, e.g., Dow, Ford, GM, Consumers' Power, DTE), and alumni (mini-campaign or transformational gift, to be solicited in conjunction with Tech Fund personnel). Members of President Tompkins's ESC will

work with Tech Fund personnel in pursuit of other opportunities as they emerge. Members of the ESC and/or student representatives will visit campuses with established programs to learn from others rather than assume the additional costs (especially time and effort) of reinventing wheels.