SUSTAINABILITY PLAN

OREGON INSTITUTE OF TECHNOLOGY
KLAMATH FALLS, OR

AUTHOR:
Carrie Wittmer, Assistant Professor, Natural Sciences
Interim Sustainability Coordinator
Oregon Institute of Technology
3201 Campus Dr. Klamath Falls, OR 97601
carrie.wittmer@oit.edu
(541) 885-1349

CONTRIBUTORS:
Cristina Negoita, Assistant Professor, Mathematics & Interim Sustainability Coordinator
Joe Stuart, Assistant Professor, Manufacturing and Mechanical Engineering and Technology
Gregg Waterman, Associate Professor, Mathematics
Oregon Institute of Technology, Klamath Falls, OR

June 11, 2008

TABLE OF CONTENTS

EXECUTIVE SUMMARY

BACKGROUND

Sustainability is becoming a focus of many higher education institutions as colleges and universities realize the need for more energy efficient facilities, climate-neutral campuses, waste and water-use reductions, and local community-based food options. Universities have an obligation to educate future leaders and citizens in all aspects related to sustainability and building a sustainable campus requires the engagement of the campus as a whole.

With the creation of the Geo-Heat Center in 1974 and the Oregon Renewable Energy Center (OREC) in 2001, the Oregon Institute of Technology in Klamath Falls, Oregon has been a leading voice in the higher education sustainability movement. The OIT Strategic Plan for 2017 identifies sustainability as a priority issue for the institution. In November of 2007, Interim President Dr. David Woodall signed the American College and University Presidents Climate Commitment, compelling OIT to make significant changes in greenhouse gas emissions over the next five years and to create an institutional action plan for becoming climate neutral. Over the next ten years OIT will develop campus operations that utilize and model great degrees of sustainability, make sustainability an educational priority, and establish and maintain a sustainability entity on campus.

MISSION

The Oregon Institute of Technology will be in the forefront of sustainability movement in higher education in the areas of campus operations, academics and community involvement.

GOALS

Plan Administration, Monitoring, and Reporting: The Sustainability Coordinator, the Sustainability Committee, and the Oregon Renewable Energy Center will support, initiate, implement, publicize, and evaluate sustainability integration at OIT while also promoting state and national sustainability initiatives.

Academics: OIT faculty encourage environmentally responsible citizenship by incorporating sustainability concepts into regular coursework across disciplines and where appropriate. OIT's administration will support faculty in this effort. OIT will utilize its renewable energy resources as a foundation for bachelor's and master's degree programs related to sustainability.

Community: OIT Campuses: OIT faculty, students, and administrators will increase awareness of sustainability issues and provide possible solutions to pressing environmental problems on OIT's campuses.

Energy: OIT will be energy independent and climate neutral by 2017 through reduction of energy consumption, improved building design, and construction of a deep-water well and high-temperature geothermal power plant.

Facilities: The office of Facilities Services enhances the educational experience of OIT students through fiscally responsible and environmentally sustainable practices that conserve resources and reduce pollution and waste.

Food: Food service on OIT campuses will integrate sustainable practices into producing desirable and healthy food products for community members.

Greater Community: OIT faculty, students, and administrators will increase awareness of sustainability issues and provide possible solutions to pressing environmental problems in Klamath Falls and outlying communities, Portland, the state of Oregon, and the United States. OIT's efforts towards sustainability integration will be well publicized as part of an educational outreach effort.

Landscape: The office of Facilities Services aims to reduce water use, pesticide and herbicide use, and maintenance costs through aesthetically-pleasing landscape design. Landscape renovations will "improve outdoor spaces for student activities and campus life" and "improve the sustainability and green design of the campus" (Mayer/Reed Landscape Architects, 2007, p. 1-2).

Procurement: Facilities Services, Food Services, and other OIT purchasing agents will obtain non-toxic products and materials as locally as possible, made from a maximum amount of post-consumer recycled material, in order to reduce pollution and environmental degradation.

Research: OIT faculty, staff, office of Facilities Services, Oregon Renewable Energy Center, Geo-Heat Center, and other entities on campus will seek funding for and implement sustainability-based research.

Transport: OIT will encourage alternative transportation use for community members, explore opportunities for distance education, and implement sustainable transportation options for the campus motor pool to reduce pollution, contribution to greenhouse gases, and environmental degradation.

Waste: OIT will conserve resources, reduce waste, and protect the health of the community through education on the importance of "Reducing, Recycling, and Reusing" in all facets of campus operations as well as ensuring proper disposal of generated waste.

Water: OIT will conserve and reduce waste of water on campus as well as ensure that the water quality remains consistently high.

THE PLAN

The OIT Sustainability Plan outlines numerous pathways to achieve its mission and goals and to assess progress in achieving them. Past and current sustainability actions were identified and future activities outlined through the Strategic Planning Initiative in 2007 and interviews conducted by two sustainability coordinators in Spring, 2008. Many of the initiatives outlined in the plan have up-front or ongoing costs, both financial and in terms of personnel. These recommendations, however, will strengthen OIT's long-term fiscal viability, broaden its opportunities for outside funding, and recruit and retain students. More importantly, OIT will graduate sustainability-educated students who will be prepared to participate in and contribute to the larger issues facing future governments, local communities, and ecological systems.

INTRODUCTION

The 1987 Brundtland Report defines sustainability as "meeting the needs of the present generation without compromising the ability of future generations to meet their own needs." In weighing individual and institutional choices using the principal of sustainability, it should therefore be understood that current environmental and social decisions have future "costs" that will be measurable, not only financially, but in the quality of life of future generations and the natural world. Sustainability is becoming a major focus for both governmental and academic institutions in the United States and abroad. The United Nations Educational, Scientific, and Cultural Organization (UNESCO) has initiated a "Decade of Education for Sustainable Development;" Oregon's Governor Kulongoski issued an executive order in 2006 called "Sustainability for the 21st Century;" and the Council for Higher Education Accreditation (among other accreditation agencies) launched a consortium focusing on sustainability. All these institutions are providing resources and impetus for the integration of sustainability into all aspects of higher education.

The Oregon Institute of Technology (OIT) in Klamath Falls, Oregon has been working towards a sustainable campus since the inception of the Geo-Heat Center in 1974, which provides resources and information about geothermal capacity-building. There have also been efforts to implement and improve recycling capacity and promote sustainability education on campus. In 2007, OIT officially committed to promoting sustainability across the institution—from academics to research, and facilities to community education—during the collaborative, all campus Strategic Plan Initiative in 2007. As a result of the Strategic Planning Initiative, it was decided that *"by 2017, OIT will be in the forefront of the higher education sustainability movement in the areas of campus operations, academics, and community involvement."* The OIT Sustainability Plan provides a road map for achieving this vision by utilizing OIT's unique strengths and geographic location. This vision relies on the leadership of the Oregon Renewable Energy Center (OREC) and the Geo-Heat Center, the Renewable Energy Systems and Environmental Science degree programs, and the availability of natural resources of the Klamath Basin. This set of assets is unique in higher education and OIT must capitalize on its strengths to bring the institution to full sustainability integration.

Three general action areas will allow OIT to accomplish its sustainability mission. All three recommendations have associated financial costs, but they also represent opportunities for reducing the institution's operating costs, attracting public recognition and students, and being environmentally responsible.

1. **Develop campus operations that utilize and model the greatest degree of sustainability**. This includes continuing with current upgrades, making sustainability a priority in further construction and grounds-keeping, food service, developing geothermal electric generation capacity on campus, making OIT the first "off-the-grid" college campus in the country, reducing consumption and waste, and maximizing recycling capabilities.
2. **Make sustainability an educational priority**. Sustainability must become a common mindset amongst all members of the OIT community by incorporating it into the university's mission statement; creating an Institutional Student Learning Outcome (ISLO) that addresses sustainability, and strengthening the Renewable Energy Systems and Environmental Science programs.
3. **Establish and maintain a sustainability entity on campus.** The roles of this entity will be to (a) coordinate sustainability efforts between various groups on campus and (b) raise both internal and external awareness of what the institution is doing in the area of sustainability.

Admittedly, many of these initiatives have up-front or ongoing costs, both financial and personnel. These recommendations, however, will strengthen OIT's long-term fiscal viability, broaden its opportunities for outside funding, and recruit and retain students. For these benefits to be accrued, the institution will need to maintain a long term commitment to sustainability integration as well as publicize its efforts and successes. This will only be accomplished through the administration, monitoring, and reporting done by a sustainability coordinator or office similar to other entities in the Oregon University System (OUS).

MISSION

The Oregon Institute of Technology will be in the forefront of sustainability movement in higher education in the areas of campus operations, academics and community involvement.

GOALS

OIT will support sustainability efforts and achieve its mission by pursuing action items in the following areas:

Plan Administration, Monitoring, and Reporting: The Sustainability Coordinator, the Sustainability Committee and OREC will support, initiate, implement, publicize, and evaluate sustainability integration at OIT while also promoting state and national sustainability initiatives.

Academics: OIT faculty encourage environmentally responsible citizenship by incorporating sustainability concepts into regular coursework across disciplines and where appropriate. OIT's administration will support faculty in this effort. OIT will utilize its renewable energy resources as a foundation for bachelor's and master's degree programs related to sustainability.

Community: OIT Campuses: OIT faculty, students, and administrators will increase awareness of sustainability issues and provide possible solutions to pressing environmental problems on OIT's campuses.

Energy: OIT will be energy independent and climate neutral by 2017 through reduction of energy consumption, improved building design, and construction of a deep-water well and high-temperature geothermal power plant.

Facilities: The office of Facilities Services enhances the educational experience of OIT students through fiscally responsible and environmentally sustainable practices that conserve resources and reduce pollution and waste.

Food: Food service on OIT campuses will integrate sustainable practices into producing desirable and healthy food products for community members.

Greater Community: OIT faculty, students, and administrators will increase awareness of sustainability issues and provide possible solutions to pressing environmental problems in Klamath Falls and outlying communities, Portland, the state of Oregon, and the United States. OIT's efforts towards sustainability integration will be well publicized as part of an educational outreach effort.

Landscape: The office of Facilities Services aims to reduce water use, pesticide and herbicide use, and maintenance costs through aesthetically-pleasing landscape design. Landscape renovations will

"improve outdoor spaces for student activities and campus life" and "improve the sustainability and green design of the campus" (Mayer/Reed Landscape Architects, 2007, p. 1-2).

Procurement: Facilities Services, Food Services, and other OIT purchasing agents will obtain non-toxic products and materials as locally as possible, made from a maximum amount of post-consumer recycled material, in order to reduce pollution and environmental degradation.

Research: OIT faculty, staff, office of Facilities Services, Oregon Renewable Energy Center, Geo-Heat Center, and other entities on campus will seek funding for and implement sustainability-based research.

Transport: OIT will encourage alternative transportation use for community members, explore opportunities for distance education, and implement sustainable transportation options for the campus motor pool to reduce pollution, contribution to greenhouse gases, and environmental degradation.

Waste: OIT will conserve resources, reduce waste, and protect the health of the community through education on the importance of "Reducing, Recycling, and Reusing" in all facets of campus operations as well as ensuring proper disposal of generated waste.

Water: OIT will conserve and reduce waste of water on campus as well as ensure that the water quality remains consistently high.

METHODS

The OIT Sustainability Plan is the result of research and discussions with various constituents on the Klamath Falls and Portland East campus. Many of the ideas in the plan arose during meetings prior to the Strategic Planning session in the Spring of 2007. A White Paper was prepared for the session by a Sustainability Task Force and has been used as a foundation for the proposed actions in this plan. Additionally, interviews with OIT administrators, staff, students, and faculty were conducted in the Spring of 2008. The ideas and proposed or committed actions in the plan are not the opinions of the author, rather, they are a compilation of actions recommended by members of the OIT Community either during the Strategic Planning Initiative or interviews in 2008. Additionally, the process is dynamic in that some things that have been committed to may need to be reconsidered due to lack of funding or time; new ideas may arise from student, faculty, or administrative interest or some may need to be addressed because they have been mandated. This document will be adjusted to changing environments and institutional needs. Individuals who commit their time and energy to work on sustainability integration need to have financial and resource support from the OIT administration through a Sustainability Coordinator. Part of that support is to articulate sustainability efforts that are occurring, set benchmarks for future projects, and monitor and reward progress on OIT campuses.

EXCLUSIONS

The OIT Portland East campus was consulted for this Plan; however, the other OIT campuses—Portland West, La Grande, Boeing, RCC-OIT Respiratory Care, Paramedic Education, and Clinical Lab Science Programs—were not part of the research or planning process. Further inclusion of these campuses and programs is highly recommended for complete sustainability across the entirety of the institution.

HISTORY

OIT has been actively participating in sustainability efforts and education since the Geo-Heat Center began operating in 1974. The efforts of the Geo-Heat Center were complimented by the legislative establishment of the Oregon Renewable Energy Center in 2001. Since that time, there have been individual initiatives in sustainability projects and efforts towards making sustainability a more integral part of all campus operations. A Sustainability Steering Committee convened in the Summer of 2003 to investigate waste, recycling, and consumption at OIT's Klamath Falls campus in an effort to reduce operating costs and exposure to liabilities. The committee consisted of representatives from campus operations and faculty. The results from the committee included recommendations to establish a Sustainability Coordinator position and development of a Sustainability Plan. Because of these recommendations, two part-time Sustainability Coordinators (Professors Hallie Neupert and Christy Van Rooyen) were appointed for a total of four quarters between 2003-2007, during which time various initiatives were implemented including an Earth Day celebration (Hallie Neupert), Sustainable Transportation Day (Christy Van Rooyen), trash audits (student Katya Spiecker), Northwest Earth Institute discussion courses (Voluntary Simplicity, Exploring Deep Ecology, Choices for Sustainable Living, Healthy Children: Healthy Planet, and Global Warming: Changing Course) (Beth Murphy), and attendance at a performance indicators conference on sustainability (Beth Murphy and Maureen Sevigny) (B. Murphy, personal communication, April 29, 2008). This committee also conducted a "Sustainability Awareness Survey" with 128 faculty/staff and 293 students in the Fall of 2003.

The Sustainability Task Force convened in the Fall of 2006 in preparation for the Strategic Planning Initiative, 2017. This committee drafted a White Paper on Sustainability at OIT, the contents of which have been included in this plan. As a result of the White Paper and conversations at the planning session, sustainability is an integral part of OIT's Strategic Plan for 2017: "OIT will be in the forefront of the higher education sustainability movement in the areas of campus operations, academics, and community involvement. OIT will develop campus operations that utilize and model the greatest degree of sustainability possible. OIT will make sustainability an educational priority; key concepts will be integrated into all levels of the curriculum and community" (OIT/2017, 2008, p. 1).

Interim President Dr. David Woodall took a decisive step to moving OIT into full sustainability integration by signing the American College and University Presidents Climate Commitment on November 16, 2007. This commitment states that

> *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* (American College and University, 2008, p. 1).

The commitment also sets up a rigorous planning and reporting schedule for achieving climate neutrality. All of this previous work on sustainability at OIT is reinforced by global, national and state initiatives that are moving sustainability into the forefront of planning in higher education.

BACKGROUND

Interest in incorporating sustainability concepts into higher education is becoming more pervasive and ultimately, may become mandated by governments and accreditation agencies. Spurred by the UNESCO "Decade of Education for Sustainable Development," a consortium of institutions, individuals, and organization has been developed, called the "US Partnership," in an effort to fully integrate sustainability into educational institutions (US Partnership, 2008). Other organizations and initiatives have formed specifically targeting sustainability in higher education such as the Association of University Leaders for a Sustainable Future (ULSF) (www.ulsf.org), Higher Education Associations Sustainability Consortium (HEASC) (www.aashe.org/heasc), Association for the Advancement of Sustainability in Higher Education (AASHE) (www.aashe.org), and American College and University Presidents' Climate Commitment.

In Oregon, Governor Kulongoski has recognized that sustainability is essential for the continued economic and environmental stability of the state. The executive order 06-02 of January 2006, Governor Kulongoski states the following:

> *Sustainability represents a significant economic opportunity for the State of Oregon. Sustainability enables state and local government to operate in a more efficient and effective manner. Sustainability benefits all Oregonians, urban and rural. Oregon prospers when the economy, the environment, and our communities support each other. Oregon's business and higher education sectors increasingly are focusing on the opportunities presented by sustainable development. The Oregon Business Plan has identified Sustainable Industries as a key development cluster for the state. The Oregon University System is pursuing opportunities to increase the focus on research and development related to sustainable technologies* (Office of the Governor, 2006).

A previous order, 03-03, required all new state buildings to meet the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) program's "Silver" certification (Office of the Governor, 2006). The Oregon State Board of Higher Education's Academic Excellence/Economic Development Working Group recommended in July of 2005 that the Board serve as the "lead organization for sustainability" (Office of the Chancellor, 2005, p. 1). The board is devising a plan for 2025 for the Oregon University System focusing on sustainability integration and sustainability was the focus of a summit of presidents, vice-presidents, and provosts of all OUS institutions in April, 2008. The summit was intended for sharing of information and efforts in sustainability across OUS institutions as well as to "develop a common message and brand for the work we all are doing in this important area" (G. Pernsteiner, March 31, 2008).

The Council for Higher Education Accreditation (CHEA) has created a consortium specific to sustainability issues, the American Society for Engineering Education (ASEE) has created a "Forum on Sustainability," and the Accreditation Board for Engineering (ABET) requires that student capstone projects must consider sustainability as part of the use of appropriate engineering standards. Dr. Dave Woodall predicts that the Northwest Commission on Colleges and Universities (NWCCU) will be developing a new program in which its priority requirement will be sustainability integration.

Considering the resources available today and those promised in the future, and based on current and future mandates both from the state of Oregon and accreditation agencies, it is in OIT's best interest to make sustainability integration a high priority across all levels of the institution. The OIT Sustainability Plan is the road map for how to proceed with this effort.

PLAN ADMINISTRATION, MONITORING, AND REPORTING

MISSION

OREC, the Sustainability Coordinator, and the Sustainability Committee will support, initiate, implement, publicize, and evaluate sustainability integration at OIT while also promoting state and national sustainability initiatives.

PAST AND CURRENT PRACTICES

- A Sustainability Steering Committee was convened during the Summer of 2003 to define ways that OIT could incorporate sustainability concepts into practices on campus. Upon its suggestion, OIT had two, part-time Sustainability Coordinators, who each served for two quarters. The position was ultimately terminated due to a lack of funding.
- A Sustainability Task Force was convened in 2006 in preparation for the Strategic Planning Initiative in the Spring of 2007. This committee became the current Sustainability Committee whose charge is to serve as a consulting body for Oregon Renewable Energy Center (OREC) as well as to identify future sustainability projects concerning facilities management, community education, and inclusion of sustainability concepts into OIT curricula. Two co-sustainability coordinators were hired for Spring term of 2008 to coordinate sustainability events on campus and to write a draft sustainability plan.
- Interim President Dr. David Woodall signed the American College and University Presidents Climate Commitment on November 16, 2007. This commitment involves a three-step action and reporting commitment with which OIT needs to comply.

SHORT-TERM GOALS (0-3 YEARS)

- The next step in the coordination of sustainability integration at OIT is to take this plan and conduct a quantifiable assessment of all of OIT's campuses. This assessment can be based on the *Technical Manual of the Sustainable Pathways Toolkit*, available from Good Company Consulting in Eugene, OR, or the ASSHE *Campus Sustainability Assessment Kit* (currently available in draft form on their website). The assessment should be managed by the sustainability coordinator, but some of the actual assessment can be done with student help. This baseline study will allow the institution to set benchmarks for assessing progress.
- Acquire permanent funding for a Sustainability Coordinator position (possibly through OREC) and associated support services like work-study students, an office, etc. The Sustainability Coordinator will be responsible for maintaining communication with all groups and individuals working on sustainability; produce an annual report on institutional progress on Sustainability Plan action items; support institutional sustainability initiatives; plan and implement sustainability activities on Portland and OIT campuses; and maintain contact with other OUS Sustainability Coordinators.
- Maintain enthusiasm and activity in the Sustainability Committee. The committee will serve as a consulting body for the Sustainability Coordinator, OREC, and the institution. The committee will also evaluate components of the Sustainability Plan for needed revisions and updates and initiate new sustainability projects.
- In accordance with the American College and University Presidents Climate Commitment, OIT must complete "institutional structures to guide the development and implementation" of a comprehensive climate neutrality plan and "complete a comprehensive inventory of all greenhouse gas emissions" (American College and University, 2008, p. 1) by November 16, 2008. This can be done using the Climate Action Toolkit from Clean Air, Cool Planet

(www.cleanair-coolplanet). Before November 16, 2009, OIT has committed to create an institutional plan for becoming climate neutral. This plan will include goals, actions, and target dates for achieving climate neutrality. These documents need to be submitted to the Association for the Advancement of Sustainability in Higher Education (AASHE).

- The Provost's office will host convocation break-out sessions where faculty and administration can generate ideas on how to participate in sustainability integration at OIT as well as express concerns or criticisms of the process.

LONG TERM GOALS (3-10 YEARS)

- OIT's Sustainability Coordinator and sustainability office continues to provide direction, oversight, and evaluation of sustainability activities at OIT's campuses. Additionally, it will be an information center for other efforts in sustainability in higher education.
- OIT's Sustainability Coordinator will assist OREC, the Geo Heat Center, and other institutional entities in utilizing OIT programs to create a one-of-a-kind Sustainable Campus with complete sustainability integration by 2017.
- OIT's Sustainability Committee and Sustainability Coordinator will develop and implement an all campus—faculty, staff, administrator, and community—input and evaluation process to write the next 10-year Sustainability Plan. Efforts will also be made to integrate Sustainability into the OIT Mission and into the Strategic Plan for 2027.
- In accordance with the American College and University Presidents Climate Commitment, OIT must create a comprehensive plan for becoming climate neutral with target dates, goals, actions, and monitoring plans.

ACADEMICS

MISSION

OIT faculty encourage environmentally responsible citizenship by incorporating sustainability concepts into regular coursework across disciplines and where appropriate. OIT's administration will support faculty in this effort. OIT will utilize its renewable energy resources as a foundation for bachelor's and master's degree programs related to sustainability.

PAST AND CURRENT PRACTICES

- OIT offers a bachelor's degree in Renewable Energy Systems at the Portland campus (first class started in Spring of 2005). The Portland campus has 55 students enrolled as of 07-08 and 70 students expected to be enrolled for 08-09 (B. Bass, personal communication, June 4, 2008).
- As of Fall of 2007, students are also able to earn a Renewable Energy Systems degree on the Klamath Falls campus. "Coursework for this degree focuses on photovoltaics, biofuels, fuel cells, wind power, hydroelectric power, energy systems design, and many more energy engineering topics" [Chester (Director of OREC), 2008, p.4].
- OIT has several other degree offerings that lend themselves to sustainability concepts: Environmental Science, General Biology, and Manufacturing Engineering Technology.
- The Manufacturing Engineering Technology program focuses on "lean manufacturing and waste reduction" (Chester, 2008, p. 1).
- Sustainability concepts are taught in the following courses at OIT: Life cycle analysis is included in numerous Manufacturing Engineering Technology courses; green product development, marketing and end-of-life-cycle (product) issues are considered in marketing and business classes; the basics of environmental economics are taught in Microeconomics; and sustainability concepts are discussed in the Environmental Social Sciences and Klamath Bioregional Studies courses.
- Many students have chosen to focus course projects on sustainability such as: Manufacturing and mechanical engineering students have undertaken projects to produce ethanol and bio-diesel from waste from the Marketplace; students installed and utilized sensors to monitor energy use in the Cannon Beach and Rose Houses. The Cannon Beach House project was chosen as the most sustainable house in the United States for 2006 by the Environmental Design and Construction organization; and a civil engineering student project designed a welcome center east of Klamath Falls that incorporated sustainable designs in its construction.
- Electrical engineering and computer software engineering programs currently design for "'net zero' and 'smart' houses and for renewable energy technologies, e.g., solar photovoltaic and ground-source heat pump integration" (Chester, 2008, p. 1).
- Interim President, Dr. David Woodall, initiated conversations with Helsinki Polytechnic and Copenhagen Polytechnic in Europe about partnership opportunities for faculty and students in an effort to broaden OIT's reach in preparing students for a more globalized and sustainability-focused world.
- OIT is in the process of proposing the nations first Renewable Energy Engineering Bachelor's of Science Degree.

SHORT-TERM GOALS (0-3 YRS)

- Create and implement the Renewable Energy Engineering Bachelor's of Science degree program at OIT's Portland East campus.

- Assess the feasibility of creating an Environmental Engineering BS program at OIT's Portland East campus (B. Bass, personal communication, June 4, 2008).
- As part of the Sustainability Assessment process, an inventory of how many classes currently have some element of sustainability in them already. This can be done by reading the course catalogue and informal surveys with faculty. Once the current integration of sustainability in the curriculum is measured, a benchmark needs to be set for how many classes the institution wants to have involved in a set number of years. Complementing this should be a plan for how to accomplish the increase.
- The Entrepreneurship and Small Business Management Program will develop a specialty in Renewable Energy (Chester, 2008).
- The Civil Engineering program will develop a "focus in green building materials and techniques and in sustainable transportation" (Chester, 2008, p. 1).
- OREC will work with OIT departments and external partnerships to expand student interest in focusing required projects on sustainability topics. Letters of commendations or awards will be offered to students whose projects best exemplify sustainability concepts.
- Maureen Sevigny is in the process of developing a new course on energy economics and policy. Sustainability will be an underlying subtext for the entire course, including such topics as renewable/depletable energy sources as well as global climate change. This course could be offered on-line to a wider audience than just the Klamath Falls campus.
- CCT (Commission on College Teaching) could host a faculty development session in ecological literacy and how to incorporate sustainability concepts into coursework.
- The Provost's office will support and encourage faculty to attend conferences on sustainability, especially where it relates to their particular discipline. Incentives will also be offered for the development of new courses on sustainability topics through Summer Productivity Grants, release time will be offered for one faculty in each department to focus on sustainability, and achievement awards will be offered for success in promoting sustainability during convocation.
- The Provost's office will host convocation break-out sessions on sustainability where faculty can generate ideas on how to incorporate sustainability concepts into courses.
- Design and propose additional courses for the Environmental Science Program called "Environmental Social Sciences," "Energy Economics," "Carbon Taxes/Markets," "Sustainable Business," "Social Science of Sustainability," and "Environmental Hydrology" and re-institute courses like "Environmental Management" (Chester, 2008, p. 3 and B. Bass, personal communication, June 4, 2008).
- Mark Clark, professor of Humanities and Social Sciences is offering a course on the "History of Energy" in Winter, 2009.
- Every year, 2-3 faculty members should be chosen to attend faculty development seminars on how to incorporate sustainability into course curriculae. The Piedmont Project, Emory University, offers a program that fosters an "invigorated intellectual community to address global issues and local environmental awareness" (Emory University, 2008) while the Natural Step Program offers a variety of workshops aiming to "help organizations, individuals, and communities move toward sustainability" (Oregon Natural Step Network, 2008).

LONG-TERM GOALS (3-10 YRS)

- Initiate certificate, minor, major, or graduate degree programs in sustainability.
- Create an ISLO (Institutional Student Learning Outcome) for sustainability.
- Create an Honors College in Sustainability at OIT, as proposed by Bob Rodgers and Jim Long.

- Grow the Renewable Energy Engineering degree program to a 150 student, 6 faculty program at Portland East. This would also require hiring full time math and writing faculty for the campus.
- Create new course offerings that incorporate hands-on experience with the campus renewable energy projects.
- Incorporate the Geo-Heat Center and its facilities and resources fully into OREC, the Renewable Energy Systems degree program, and other related programs such as Civil Engineering. Students should be actively involved in utilizing the Center for sharing information, project ideas, and hands-on experience.
- Incorporate statistical information about sustainable practices at OIT in recruitment brochures and alumni correspondence.
- Portland East will integrate sustainability concepts into all facets of the curriculum (L. Colligan, Director of Portland campuses, personal communication, April 24, 2008).

COMMUNITY: OIT CAMPUSES

MISSION

OIT faculty, students, and administrators will increase awareness of sustainability issues and provide possible solutions to pressing environmental problems on OIT's campuses.

PAST AND CURRENT PRACTICES

- OIT's Geo-Heat Center was established in 1974 and provides tours of the campus and community geothermal uses to educate students and interested investors in the benefits of geothermal energy, as well as assisting in the development of the geothermal uses" (Lund & Boyd, 2007, p. 17). OIT's Geo-Heat Center is the only US institution dedicated to geothermal applications worldwide.
- A study (Wills, B., Denton, L., Goosen, J., Spicer, J., & Perez, C, n.d.) conducted by one of Hallie Neupert's Management classes showed that 6.5% of faculty and 27.5% of the student body were not aware of the location of recycling bins. This is just one measurement indicating that increased education of OIT's student body is essential for sustainability integration.
- Joe Stuart gave two presentations on Sustainability at OIT's Klamath Falls campus during 2006 and 2007 convocations.
- Marilyn Herrington coordinated the Recylemania Contest on the Klamath Falls campus in 2007 and 2008 with student help.
- Carrie Wittmer gave a presentation on Sustainability at OIT to students in the Introduction to Environmental Sciences class Fall of 2007.
- OIT's student Sustainability Club, in conjunction with Oregon Tech Student Management Association (OTSM) and the Sustainability Committee, hosted the first OIT Earth Day Celebration in April of 2008 on the Klamath Falls campus (See Figure 1).

Figure 1. Earth Day presentation by the Student Sustainability Club, Spring 2008 (Photo credit: Kristina Maupin).

SHORT-TERM GOALS (0-3 YRS)

- Marilyn Herrington, Custodial Supervisor, Facilities Services, will coordinate OIT's participation in the Recyclemania contest, including the creation of promotional materials for recycling on the Klamath Falls campus.
- Cristina Negoita, mathematics professor, will work with Joan Loustalet, Director of Disability Services, to incorporate sustainability topics into ACAD101-Student Success Seminar. The course will include having students meet speakers from the local community leaders in sustainability issues (such as organic farmers, solar companies, etc.) as well as conducting a trail clean-up in Link River Canyon.
- The Sustainability Coordinator will present OIT's sustainability efforts and programs during the September Institute for new faculty, new student orientations, and convocation.
- Acquire funding for building geothermally heated greenhouses and an aquaculture facility through OIT's Geo-Heat Center. These two facilities can be heated with waste water from OIT's current geothermal process and does not require water from the deep, high temperature well.
- Incorporate Geo-Heat Center, OREC, and sustainability-related presentations in admissions materials, new student activities, the September Institute for new faculty, and convocation to promote awareness of OIT's sustainability projects.
- Establish a more visible OREC presence on OIT's Klamath Falls and Portland campuses and incorporate OREC and the Geo-Heat Center fully into academic and social events.

LONG-TERM GOALS (3-10 YRS)

- OIT's Sustainability Coordinator, sustainability office, and/or OREC develop and implement sustainability education programs, events, conferences, or workshops on OIT's campuses.
- OIT's Sustainability Coordinator will train and coordinate faculty volunteers, Sustainability Club members, and work-study students in campus and community outreach.
- OREC and the Provost's Office will provide incentives and awards for sustainable efforts, behaviors, or initiatives by individuals, departments, or other campus groups.
- Build and use geothermally heated greenhouse and aquaculture facility to train renewable energy students, potential developers, and community members to "help transfer geothermal use to other locations throughout the country" (Lund & Boyd, 2007, p. 17) as well as development of its use in agriculture.
- Support, utilize, and publicize the Geo-Heat Center as a one-of-its-kind institution housed exclusively at OIT. The Geo-Heat Center should be an integral component of the Renewable Energy Systems degree and other related programs as well as a centerpiece for OIT's sustainability integration effort.

ENERGY

MISSION

OIT will be energy independent and climate neutral by 2017 through reduction of energy consumption, improved building design, and construction of a deep-water well and high-temperature geothermal power plant.

PAST AND CURRENT PRACTICES

- All heating needs on campus are currently provided geothermally. "In the early 1960's, three deep wells were drilled tapping geothermal hot water at 192°F. This hot water now heats the entire campus of about 650,000 sq. ft. saving about $1,000,000 annually in heating and domestic hot water costs…The installed capacity of this system is 6.2 MWt and the annual energy use is about 47 billion Btus, saving 10,000 tons of CO_2 emissions annually (compared to producing it from petroleum)" (Lund & Boyd, 2007, p. 16).
- Facilities Services conducted two energy conservation programs in 2000 and 2002. These programs addressed inefficient lighting systems throughout the campus. Light fixtures were replaced or renovated with high efficiency electronic ballasts and t-5 and t-8 fluorescent tubes. Occupancy sensors were installed in numerous offices and restrooms. Fixtures are continually upgraded as resources become available. Electricity consumption has been reduced by 25% through these programs.
- In 2001, as part of an analysis for construction of a new residence hall, it was established that the wind resources at OIT were not sufficient to make wind generated power a viable energy source for the campus.
- All geothermal wells have been renovated using frequency drive motors and digital controls to optimize efficiency. All of the campus' heat-exchangers and circulating pumps (one or more in each building) have been rebuilt or replaced for efficiency.
- Test drilling for a deep, high temperature geothermal well takes place in April of 2008 (See Figure 2).
- Air handlers are currently shut down on nights and weekends to reduce electricity consumption.
- OIT won the National Wildlife Federation's "Chill Out! Campus Solutions to Global Warming" competition for the 2006-2007 school year, highlighting OIT's achievement in being an innovator of global warming solutions on college and university campuses.
- Meeting US Green Building Council's Leadership in Energy and Environmental Design (LEED) Silver standards (or higher) is required by the State of Oregon for all new buildings. LEED standards emphasize energy efficiency, especially efficient use of fossil fuels.
- Dr. David Woodall, interim President, signed the American College and University Presidents Climate Commitment on November 16, 2007 and committed OIT to achieving climate neutrality.
- The *New York Times* recently ran an article featuring "Renewable Energy Systems" and quoted Professor Bob Bass from OIT's Portland East campus.
- Portland East has initiated a "full building energy and resource audit through a Renewable Energy Systems class taught by Cody Jones" (D. Swanson, personal communication, April 18, 2008).
- Portland East has "reviewed its programmable thermostat cycles to better meet room usage and conservation" parameters (D. Swanson, personal communication, April 18, 2008).

Figure 2. Seismic testing for the deep geothermal well in Spring 2008 (Photo credit: Kristina Maupin).

SHORT-TERM GOALS (0-3 YRS)

- Construction of a deep-water (approximately 3,500 ft. depth), high temperature well and a one megawatt generating capacity power plant. Production will meet 100% of the electricity demand on campus, saving approximately $500,000 annually and reducing CO_2 emissions by 16,000 tons annually (compared with producing the same amount of electricity from petroleum products) (Lund & Boyd, 2007). *The Oregon University System Greenhouse Gas Inventory* (2007) determined that 92.4% of OIT's 2004 core greenhouse gas emissions came from purchased electricity—the deep water well and generating plant would nearly eliminate OIT's greenhouse gas emissions.
- Require meeting Gold LEED standards on the new Klamath campus dormitory and include solar panel construction in its design.
- Research and seek funding for the development of other solar power opportunities at the Klamath Falls campus including solar array-covered parking facilities.
- The Center for Health Professions buildings' roofs were designed to be compatible with future solar projects. Funding should be acquired for the design of a solar photovoltaic system for the two new buildings.
- The *OIT Landscape Master Plan* (Mayer/Reed Landscape Architects, 2007, p. 22) recommends using "energy efficient outdoor lighting" and "developing photovoltaic energy sources for campus electricity needs [by] extending arrays mounted to covered walkways in the west parking lot."
- The Portland East campus will propose and implement ways to improve building efficiency. An immediate need is to acquire approximately $7,000 in funding to install a solar energy panel rack for the roof of OIT's Portland East campus to accommodate donated solar panels. This solar panel array will be used for student experiments and projects.
- Seek and acquire funding for a renewable energy, LEED Platinum retrofit of the gymnasium at OIT's Portland East campus. This building would be the Clackamas County Green Center as well as a laboratory for Renewable Energy Systems/Renewable Energy Engineering students and could include technology such as ground source heat pumps, solar, passive solar, etc.

LONG-TERM GOALS (3-10 YRS)

- Excess electricity from the high temperature power plant will be sold back to the power grid. "Waste" water from the plant will be used to power a smaller low-temperature power plant and the water can then be used for space heating.
- Construct photovoltaic arrays on campus buildings and grounds including the Center for Health Professions; possibly include solar array covered parking facilities to produce electricity and reduce the heat-island effect. Solar facilities would be an integral part of OIT's energy independence and could be incorporated into OREC, the Renewable Energy Systems degree program, and other programs such as Civil Engineering.
- A feasibility study should be conducted to re-evaluate wind generated energy potential for OIT in order to include it as a part of an energy independence program.
- Seek and acquire funding for a feasibility study for the replacement of natural gas use through use of an on-site biodigester using landscape and food wastes (B. Bass, personal communication, June 4, 2008). Natural gas is mostly used in food services and in conjunction with sewage treatment, remains one of the ways in which OIT is connected to the "grid" and is not self-sustaining.
- Use performance contracting to develop a "Green Technology Center" where OIT would create its own energy and uses the accumulated financial savings for other operations. Energy independence would establish OIT as the first off-the-grid higher education institution in the United States; associated benefits would include branding opportunities, competitive edge ahead of other institutions offering Renewable Energy Systems degree programs, and exceptional educational opportunities for OIT students. The Renewable Energy Park would create educational opportunities for the larger community as a county, state, and national resource for renewable energy innovation and use.
- Acquire funding for a building-by-building energy use information system where current energy use in the building is calculated and displayed.
- Plant shade trees on west sides of buildings to avoid afternoon solar gain (Mayer/Reed, 2007) (See Figure 3).
- Conduct a renewable energy retrofit on the gymnasium at the Portland East campus to create the Clackamas County Green Center.

Figure 3. Deciduous trees planted at Purvine Hall reduce solar gain during the Summer, but allow for solar gain in the Winter (Mayer/Reed, 2007, p. 23).

FACILITIES

MISSION

The office of Facilities Services enhances the educational experience of OIT students through fiscally responsible and environmentally sustainable practices that conserve resources and reduce pollution and waste.

PAST AND CURRENT PRACTICES

- The OIT campus's geothermal resources heat sidewalks, handicap ramps, and stairs, reducing maintenance and improving safety in cold weather.
- OIT's request for an F- bond will go before the legislature in June of 2008. If approved, OIT will have a new residence facility in 2010. Affordable student housing will encourage on-campus living and as a result, will "reduce the number of car trips made by OIT students between home and school" (Chester, 2008, p. 5).
- The Governor of Oregon mandates that all new State buildings achieve a LEED Silver certification. The Oregon Center for Health Professions buildings meet this mandate. The College Union project and the Snell Hall project did not require LEED certification but were constructed using sustainable practices.
- OIT's Portland East campus "is closely involved with the Clackamas County Green Ribbon planning project and is being considered as a potential partner in the county's new Green Economy Center" (Chester, 2008, p. 5).

SHORT-TERM GOALS (0-3 YRS)

- Build new student housing that exceeds LEED "Silver" standards. The project aims to "position buildings for zero-energy strategies" (Soderstrom, 2004, p. 1). Zero energy use will be achieved through a variety of methods including high efficiency lighting, high insulation levels, natural ventilation cooling, integrated solar and geothermal heating, and demand controlled ventilation based on carbon dioxide sensing. LEED Silver standards will be met based on light pollution reduction; exterior design to reduce heat island both on the roof and off; water efficiency and use reduction; optimized energy performance; drought-tolerant landscaping; use of renewable energy sources; resource reuse; use of local/regional materials; certified wood materials; use of low-emitting materials; design for allowing daylight into buildings; passive solar design; and ventilated hallways design" (Soderstrom, 2004, p. 6).
- Utilize non-toxic paints, flooring and materials whenever possible.
- Use sustainable practices in all new construction and renovations.
- Roof renovations of Semon Hall, Summer of 2008, include integrated solar roofing system capable of generating 40-50 kW of electric power.
- Facilities Services is working with a consulting firm to develop a tracking solar array for the Klamath Falls campus to generate up to 240 kW of electric power (Chester, 2008).
- Renovations of Semon Hall and Owens Hall, Summer of 2009, will include use of sustainable materials when possible, asbestos and lead removal, high efficiency motors in air handling systems, high performance lighting fixtures, super-insulating roof materials, and expanded use of digital control to increase energy efficiency.
- New construction of sidewalks and stairs will utilize geothermal heating for snow removal where placement is near an already established source. Two-thirds of new wheelchair ramps and 400 ft. of new sidewalk will be heated.

- Seek and acquire funding for project, wet, heat and fluids, and mechanical engineering labs at OIT's Portland East campus. Currently, student facilities are inadequate and need upgrading.
- Seek and acquire funding for general upgrading projects at OIT's Portland East campus. Example upgrades could include additional tree planting in the parking lots to decrease the heat island effect and increasing the aesthetic value of the campus and the inner courtyard could be planted with a native plant garden. These improvements would increase recruiting potential for Portland East programs.

LONG-TERM GOALS (3-10 YRS)

- Attain the highest LEED certification possible in all new construction.
- Install the tracking solar array on OIT buildings.
- All renovations should maximize the use of sustainable practices.
- Portland East and OREC will seek funding for and construct a three-storey building on the site which will house a Green Technology Center for exhibition and education around alternative energy (L. Colligan, personal communication, April 24, 2008).
- Build and install upgraded laboratory facilities for the Portland East campus including project, wet, heat and fluids, and mechanical engineering labs.
- Upgrade the Portland East campus to improve aesthetic qualities, recruit students, and play a stronger role in the local community.

FOOD

MISSION

Food service on OIT campuses will integrate sustainable practices into producing desirable and healthy food products for community members.

PAST AND CURRENT PRACTICES

- Campus Dining participates in local biodiesel projects by selling used frying oil (C. Dalla, personal communication, June 3, 2008).
- In the Summer of 2007, Campus Dining switched to Fair Trade Coffee. Other sustainability initiatives by Campus Dining include purchasing local potatoes, offering a discount for bringing your own coffee mug, providing unbleached, recycled paper content napkins, and purchasing bread from Williams Bread Co., based in Eugene (C. Dalla, personal communication, June 3, 2008).
- Spring of 2008, ASOIT convened a food focus group with Aramark Corporation to discuss options for OIT dining. Sustainability measures were discussed at this meeting.
- Spring of 2008, student Dan Goettel (2008) wrote a technical report titled, "Getting Started: The OIT Local Foods Project" outlining recommendations for purchasing local foods for OIT's Marketplace. The report outlines reasons for changing to locally purchased foods, details other Oregon colleges involved in this type of initiative, and provides a list of farmers within 125 miles of the Klamath Falls campus who have shown interest in selling their products locally.

SHORT-TERM GOALS (0-3 YRS)

- Enhance food service on campus. The following topics should be considered, defined in order of priority, and negotiated as appropriate: composting organic waste from food service activities, procurement of local and/or organic foods and products, eliminating use of trays in the dining area, elimination of use of Styrofoam, purchasing decomposable disposable "plastic" ware, and using non-toxic linen cleaning services.
- Start charging ten cents for disposable cups at all of the campus coffee shops in order to encourage the use of re-usable mugs.
- Purchase locally available food products whenever possible in order to reduce OIT's contribution to producing Green House Gases (GHG), benefit the local economy (a 1% increase in the food budget spent on local food is equal to approximately $4,180 for the local economy), improve food quality, establish relationships with the local community, and provide educational opportunities for students and staff on sustainable practices (Goettel, D., 2008).
- Include "food origin" labels on all dishes with main ingredients from within a 125 mile radius (B. Bass, personal communication, June 4, 2008).
- Investigate Health Department regulations on college purchases of non-FDA certified beef in order to move toward purchasing locally raised beef products for the Marketplace.
- Create and implement a student education plan for reduction in consumption of to-go containers.
- Collaborate with the Local Food Network in Klamath Falls.

LONG-TERM GOALS (3-10 YRS)

- Continue to identify ways to integrate sustainability into food service at OIT's campuses and implementing them as often as possible. Implement sustainable practices in Campus Dining where feasible.
- Eliminate the use of processed and pre-packaged foods when feasible.

GREATER COMMUNITY

MISSION

OIT faculty, students, and administrators will increase awareness of sustainability issues and provide possible solutions to pressing environmental problems in Klamath Falls and outlying communities, Portland, the state of Oregon, and the United States. OIT's efforts towards sustainability integration will be well publicized as part of an educational outreach effort.

PAST AND CURRENT PRACTICES

- OIT's Geo-Heat Center was established in 1974 to "provide information and technical assistance for persons and organizations nation-wide and internationally to develop and utilize geothermal energy" (Lund & Boyd, 2007, p. 17). OIT's Geo-Heat Center has an "ongoing involvement with the revitalization of historic downtown Klamath Falls, offering technical assistance on the city's geothermal district heating system that heats buildings and sidewalks" (Chester, 2008, p.5).
- OIT's Geo-Heat Center published a free-distribution *Quarterly Bulletin* highlighting new geothermal technologies that was funded through a grant from the US Department of Energy. The grant has expired and due to lack of funding, as of January 2008, the *Quarterly Bulletin* is no longer being published.
- The Oregon Renewable Energy Center was established in 2001 to "integrate renewable energy technologies into energy systems for practical use by businesses and consumers." "OREC promotes energy conservation and renewable energy use in Oregon and throughout the Northwest through applied research, educational programs, and practical information. Wise energy use is the foundation for a sustainable economy, good jobs, and economic prosperity" (OIT/OREC, 2008, p. 1).
- During the Winter and Spring terms of 2005, Beth Murphy led discussion groups through the Northwest Earth Institute. The first term topic was Choices for Sustainable Living and the second was Globalization and Its Critics.
- OIT business and engineering faculty and students are providing technical assistance to a biodiesel producer in the Klamath Falls area (Chester, 2008).
- OIT faculty Bob Rogers is working in Lake County with the Lake County Renewable Energy Working Group and the town of Lakeview to "establish renewable energy as the prime new business in the county; develop a technology and business plan to replace oil heaters with ground-source heat pumps; secure funding for feasibility studies for geothermal heating systems for the town of Lakeview and the school in the town of Paisley; develop a plan in conjunction with the local state prison in Lakeview on training prisoners as renewable energy equipment installers" (Chester, 2008, p. 2).
- "OREC is developing a plan with the State Department of Corrections on ways to develop educational programs for inmates at the correctional facility in Lakeview on installation of renewable energy technologies such as solar water heating systems and ground-source heat pumps" (Chester, 2008, p. 5).
- OIT has "developed the first renewable Energy Demonstration Center in the Northwest at the Lake County Fairgrounds through donations from Pacific Power" (Chester, 2008, p. 4).
- OREC is available to consult with businesses on renewable energy projects and is currently working with Macy's department stores to develop the "largest retail business photovoltaic power installation in the US (Chester, 2008, p.2).

- OIT is "working with the Klamath Tribes on how to use their biomass resource as a sustainable source of energy" (Chester, 2008, p. 3).
- OIT is the "technical expertise for the Klamath County Biofuels Taskforce which is seeking ways to increase production of liquid fuels from renewable sources in the Klamath Basin" (Chester, 2008, p. 3).
- "Environmental science students have contributed to eco-tourism and recreation trails management through several GIS projects (preparing the Klamath Basin Birding Trail map, mapping off-highway vehicle trails for the Fremont-Winema National Forest, and mapping invasive weeds in the Bear Valley National Wildlife Refuge" (Chester, 2008, p. 3).
- Renewable energy systems "students have found internships with the Energy Trust of Oregon, Conservation Services Group, ShorePower, Oregon Department of Energy, and ImaginEnergy" (Chester, 2008, p. 4).
- OIT is offering a pre-college Summer program in 2008 focusing on sustainability, renewable energy, and green technologies (Chester, 2008).

SHORT-TERM GOALS (0-3 YRS)

- OIT's Sustainability Coordinator and the Director of OREC will establish commitments and relationships with surrounding community members such as Klamath Sustainable Communities, the Urban Issues Working Group of the Klamath Watershed Partnership, local businesses, and schools.
- Acquire funding for the *Geo-Heat Center Quarterly Bulletin*, and resume publication starting Fall 2009. Change the bulletin to an on-line format and significantly increase distribution.
- Portland East will initiate participation in Earth Day by providing relevant workshops and having an open house for the Renewable Energy Systems program (L. Colligan, personal communication, April 24, 2008).
- Students, faculty, and staff will participate in a Sustainability Conference at the University of Oregon in October of 2008. The conference will be an opportunity to both provide and receive information on how to integrate sustainability into OUS facilities as well as to network with sustainability representatives from other campuses.

LONG-TERM GOALS (3-10 YRS)

- OIT's Sustainability Coordinator, sustainability office, and/or OREC develop and implement sustainability education programs, events, conferences, or workshops in surrounding communities, including local K-12 schools. OIT's sustainability entities will also coordinate utilization of OIT's renewable energy facilities for education programs from visiting groups.
- Partner with Klamath Sustainable Communities to sponsor a second Klamath Basin Sustainability Forum (the first one took place in 1996) involving community leaders and the public (L. Lowe, personal communication, May 23, 2008).

LANDSCAPE

MISSION

The office of Facilities Services aims to reduce water use, pesticide and herbicide use, and maintenance costs through aesthetically-pleasing landscape design. Landscape renovations will "improve outdoor spaces for student activities and campus life" and "improve the sustainability and green design of the campus" (Mayer/Reed Landscape Architects, 2007, p. 1-2).

PAST AND CURRENT PRACTICES

- OIT has a fully automated irrigation system that reduces water waste and times irrigation for low evaporation times of day.
- OIT has an arboretum in the south east corner of campus that displays a variety of tree species.
- In 2007, Mayer/Reed Landscape Architects solicited input from the campus community to create an *Oregon Institute of Technology Landscape Master Plan.* This plan will define future landscape renovations on the Klamath Falls campus.

SHORT-TERM GOALS (0-3 YRS)

- Implement Landscape Master Plan developed in 2007 (Mayer/Reed Landscape Architects, p. 2):
    - Increase outdoor seating areas and outdoor use spaces.
    - "Make visual and physical connections to adjacent native landscape.
    - Increase plant diversity while preserving original planting design intent.
    - Use native and/or drought tolerant plants to conserve water where appropriate." (A recommended plant list detailing which plants are native is located in the appendix of the *Master Plan*.
- Involve students, faculty, and staff in a "Beautification Day" at OIT.
- Return the fountain near Purvine to working condition.
- Reduce irrigation needs through native plant landscaping. Reduce grass planting, which requires water, fertilizing, and excessive maintenance.
- Eliminate the use of pesticides and herbicides on campus.
- Eliminate the use of petroleum-based fertilizers.
- Compost fertilizer from Klamath County Sanitary District.
- Develop a perimeter walking and jogging path around the campus. "The mileage would be posted at ¼ mile segments so that trail users know the amount of exercise they are getting. It is anticipated that the trail will be popular with hospital visitors and employees as well as OIT students and faculty" (Mayer/Reed Landscape Architects, 2007, p. 9).

LONG-TERM GOALS (3-10 YRS)

- Educate the OIT community about the benefits of xeriscaping. Include some xeriscaping aspects into the OIT landscape.
- Eliminate the use of mechanized landscape equipment such as leaf blowers, mowers, and edgers as much as possible.
- Ban the use of 2-cylce engines that are inefficient and polluting.
- Provide more outside space conducive to studying (benches, tables, etc.).
- More fully integrate the OIT arboretum into campus events and academic coursework through improved publicity.

- "Establish a special native plants display area" in the Northwest corner of campus to complement the Arboretum (Mayer/Reed Landscape Architects, 2007, p. 5).
- Screen parking lots and service areas with large canopy shade trees or shrubs. Tree plantings should be coordinated with future solar panel project and will reduce heat island effect (Mayer/Reed Landscape Architects, 2007).
- The *OIT Landscape Master Plan* (Mayer/Reed Landscape Architects, 2007, p. 20) recommends using "native and adaptive plants as much as possible to reduce irrigation demands; choosing plants to attract birds and enhance wildlife habitat; choosing hardy, disease free, reliable species of plants to reduce maintenance and tree replacement; planting steep slopes with low shrubs and ground covers; using terracing if necessary to reduce soil erosion; increasing tree species diversity on campus; and establishing campus standard signage for trees and plants of botanical interest." Additionally the plan recommends planting the northeast corner of Cornett Hall with a native seed mix to beautify the parking lot area.

Figure 4. Heat island effect could be mitigated by additional tree plantings (Mayer/Reed Landscape Architects, 2007, p. 23).

PROCUREMENT

MISSION

Facilities Services, Food Services, and other OIT purchasing agents will obtain non-toxic products and materials as locally as possible, made from a maximum amount of post-consumer recycled material, in order to reduce pollution and environmental degradation.

PAST AND CURRENT PRACTICES

- Food Services in the College Union purchases napkins with recycled paper content.
- The custodial staff has cut the use of chemicals by going to a product that is pre-measured and is a certified "green" product.
- Portland East has developed a "data base line for resource consumption and conservation" (D. Swanson, personal communication, April 18, 2008).

SHORT-TERM GOALS (0-3 YRS)

- Have "100% post-consumer recycled paper" a print option on all Document Resource Center forms.
- Have "100% post-consumer recycled paper" in all buildings for local print jobs.
- Create the default printing setting at all copiers and printers as two-sided.

LONG-TERM GOALS (3-10 YRS)

- Use 100% post-consumer recycled paper for all campus printing jobs.
- Promote the use of e-books (B. Bass, personal communication, June 4, 2008).

RESEARCH

MISSION

OIT faculty, staff, office of Facilities Services, Oregon Renewable Energy Center, Geo-Heat Center, and other entities on campus will seek funding for and implement sustainability-based research.

PAST AND CURRENT PRACTICES

- Interim President, Dr. Dave Woodall, initiated conversations with Helsinki Polytechnic and Copenhagen Polytechnic in Europe regarding possible collaborative sustainability projects.
- Sustainability was named "topic of choice" for Summer productivity grants, 2008.
- Hugh Currin and Jim Long's proposal for "Horizonatal Axis Wind Turbine Free Wake Model for AeroDYN" was funded $23,500 in May of 2008 by the Built Environment and Sustainable Technologies (BEST) signature research center.
- Jim Long and Marc Timmerman proposal "Biodiesel Grade Oil Extraction Automation and Control" was funded $26,500 by BEST in May of 2008.

SHORT-TERM GOALS (0-3 YRS)

- Obtain grant funding for projects that incorporate sustainability into the curriculum.
- Initiate conversations and agreements for partnerships in globally competitive applied research with academic institutions outside of the United States.

LONG-TERM GOALS (3-10 YRS)

- Develop and implement specific projects in partnership with other applied research institutions.
- OIT will be a center for sustainability and renewable energy research and education where students, community members, and visitors can see projects in action.
- OIT faculty will have sustainability research projects that include undergraduate research assistants.

TRANSPORTATION

MISSION

OIT will encourage alternative transportation use for community members, explore opportunities for distance education, and implement sustainable transportation options for the campus motor pool to reduce pollution, contribution to greenhouse gases, and environmental degradation.

PAST AND CURRENT PRACTICES

- *The Oregon University System Greenhouse Gas Inventory* (Oregon University System, 2007) determined that 2.9% of OIT's greenhouse gas emissions were from fleet, maintenance, and personal vehicle use. The estimated total gasoline use for OIT for 2004 was 22,998 gallons and air travel purchases during 2004 were $154,500.
- According to the *Oregon University System Greenhouse Gas Inventory* (Oregon University System, 2007), the fuel usage from the on-campus pump serving fleet vehicles was 5,878 gallons of gasoline and 971 gallons of diesel. In 2004, the OIT president used 216 gallons of fuel for business travel.
- May 25th, 2005 was the first Sustainable Transportation Day at OIT; people were encouraged to use sustainable forms of transportation for a day. Sixty people participated in a drawing for six prizes that were donated by local businesses (C. Vanrooyen, personal communication, May 6, 2008).
- Students from taking the Business Research Methods course, BUS 456, conducted a study on carpooling and modes of transportation at the Klamath Falls OIT campus. The study showed that 63% of students and 22.5% of faculty/staff drive to campus in a car, 21.5% of students and 18% of faculty/staff drive SUVs, and 14% of students and 15% of faculty/staff drive light trucks. 1% of faculty/staff ride the city bus while 2.73% walk. 19% of students who walk to campus are students living in the dorms. 11.9% of faculty and 27.1% of students surveyed answered "always" to the question, "Do you currently carpool?" To promote carpooling on campus, this student group recommended a carpooling board and carpooling website, and creating carpooling incentives such as designated parking spots and discounts on parking permits (Bland, M., Collins, J., Shadley, A., & Voils, J., 2003).
- Another group of students from the Business Research Method course, BUS 456, conducted a study (Burket, B., Doane, J., Espelund, L., & Ochoa, N., 2003) on the use of Basin Transit Service (public bus service) at the OIT Klamath Falls campus. The results of a survey conducted for the study showed that 96.09% of faculty/staff and 97.47% of students surveyed do not use the city bus system. 36% of those surveyed said that the reason they don't use the bus is that it is inconvenient. Many stated that their reason for not using the bus is that they have a car. Some of the respondents said that they lived outside the city and did not have access to the bus system. Students use the bus system more than faculty. This student group recommended increased education to encourage bus use by pointing out the personal and societal benefits of increased use of public transportation.
- Through expansion of on-line course offerings, (growth specifically in business and management courses), there has been a significant amount of avoided miles of travel for students. This has been especially prevalent with the Portland campuses where students live a significant distance from OIT (M. Sevigny, personal communication, April 29, 2008).
- OIT students and employees can obtain free bus passes for the Basin Transit System in Klamath Falls.

- Public transportation to both OIT's Portland East and West campuses is available, but is not well used. The Max Line public transportation service will soon be coming to within a mile of the Portland East campus.

SHORT-TERM GOALS (0-3 YRS)

- OIT administration will provide incentives for community members to carpool or bike ride to campus. Possible incentives could be increases in parking permits and providing bonuses or prizes for bicycle commuters and carpoolers.
- Facilities services will assess the purchase and use of alternative energy equipment and vehicles for the campus motor pool in order to significantly reduce gasoline and diesel use while also reducing greenhouse gas emissions.
- Assess and decrease OIT business-related travel. Not only will decreases in travel result in cost savings, but will also decrease dependence on fossil fuels and reduce greenhouse gas emissions.
- The *OIT Landscape Master Plan* (Mayer/Reed Landscape Architects, 2007, p. 2) has an objective to create landscape designs that "encourage walking and bicycling as alternative transportation modes."
- The *OIT Landscape Master Plan* (Mayer/Reed Landscape Architects, 2007) recommends installing standard bicycle racks at main building entrances and improving campus safety for pedestrian circulation.
- Provide priority parking spaces for people who carpool.
- Provide a "carpool" board for students to pair up for car pooling, for either short or long distances.

LONG-TERM GOALS (3-10 YRS)

- Investigate the possibility of a 4-day course schedule which would reduce commute travel to campus for both students and staff. Additionally, consider reducing support positions to a 4-day work-week as well.
- Purchase or manufacture low-emissions vehicles for the campus motor pool.
- Once OIT has geothermally-produced electricity, the option of providing parking spots for electric and plug-in hybrid cars should be explored (Chester, 2008).
- "Encourage people to walk to and from the campus. Add a new walkway at the corner of Boivin Hall connecting to Campus Drive/Dan Obrien Way and the nearby commercial district" (Mayer/Reed Landscape Architects, 2007). This intersection should have crosswalks to make access to Campus Drive safe.

Figure 5. Corner of Campus Drive and Dan Obrien Way that could be improved for pedestrian circulation (Mayer/Reed Landscape Architects, 2007).

WASTE

MISSION

OIT will conserve resources, reduce waste, and protect the health of the community through education on the importance of "Reducing, Recycling, and Reusing" in all facets of campus operations as well as ensuring proper disposal of generated waste.

PAST AND CURRENT PRACTICES

- A Sustainability Awareness Survey was conducted in Fall 2003. The results of the survey showed that 53% of faculty/staff surveyed and 84% of students were not familiar with recycling locations. 43% of faculty/staff and 34% of students stated that their reasons for not recycling was that it was not convenient, 33% of faculty/staff and 22% of students said that it was because of lack of knowledge. The material that was recycled most by faculty/staff was paper and the most by students was aluminum.
- A follow-up Sustainability Awareness Survey was conducted in Spring 2008 by the OIT Student Sustainability Club and the Sustainability Committee. 60 students responded to the survey and produced the following results: 85% of those surveyed said that they strongly agreed or agreed to the statement, "I am concerned about the environment." 94% responded that they strongly agree or agree to the statement, "I think it is important to recycle or reuse." Over 25% disagreed or strongly disagreed to statements about having enough recycling containers on campus, recycling information, and the convenience of recycling on campus. 93% of those surveyed recycle at home.
- Grass clippings and leaves are collected, composted, and then blended with compost from the Klamath Falls Sanitation department and then re-distributed on the campus grounds as fertilizer. Branches and brush are collected and stored until there is enough material to justify paying for a grinder. These ground-up chips are used in flower beds on campus.
- Food services recycles as much cardboard, plastic, metal and office paper as possible.
- Campus electronic waste gets donated to Monitors & More in Roseburg, a not-for profit organization that refurbishes computers and other equipment. Plastic and metal components of non-refurbishable items are recycled. The best working equipment is donated to local schools, Integral Youth Services, or the Klamath Children's Museum. High dollar electronic equipment gets sold on the DAS Surplus E-Bay site. Currently nothing electronic goes to the landfill.
- Metal waste is recycled locally.
- The Residence Hall recycles; RAs collect cans and bottles to sell for money for programs. The Residence Hall office recycles, including shredding and recycling confidential material. All Residence Hall offices and bathrooms have light switches with motion sensors, and during breaks residents are encouraged to unplug everything in their rooms.
- OIT has a recycling program throughout the campus and has containers (blue and green) readily available for recycling.
- In a trash audit conducted in Winter term of 2005, approximately 32% of trash that ended up in the garbage could have been recycled. A second audit was conducted after an awareness campaign during Spring term of 2005 by a senior in the Environmental Science program. This educational campaign reduced the amount of recyclables found in the garbage from 32% to 24%.
- In 2007 and 2008, OIT participated in Recylemania, a national recycling competition in order to increase awareness and commitment to recycling on campus. In 2008, OIT placed 18th in the nation and first in Oregon for per-capita cumulative recycled pounds per person.

- Asphalt and concrete that is removed during renovation and construction projects is hauled away, processed, and reused.
- The Paper Owl bookstore has postage-paid envelopes for recycling spent printer cartridges.
- Portland East has recycling containers throughout its building and encourages all tenants to recycle. The campus also recycles and refills toner and ink cartridges. Old computers are donated to the Beaverton High School Program.
- The Human Resources office has saved over $80,000 in the last two years by doing on-line recruitment. Jobs are posted on the OIT website, HigherEd Jobs.com, and other electronic sites. The office has also changed to an on-line application process and request that applicants submit electronic documents via email. The documents are posted on a common network drive in a fold that is accessible only to members of the search committee and HR staff. Search committee members review electronic documents and are discouraged from printing a copy. Performance evaluations are also done on-line—only one final copy is needed for signatures. (R. McCutcheon, personal communication, May 28, 2008).

SHORT-TERM GOALS (0-3 YRS)

- Throughout the faculty and administration, encourage paperless offices and coursework to reduce paper waste.
- Reduce paper use on campus through use of smaller print, double-sided copies, utilization of electronic communications whenever possible, and limiting student printing at school computers.
- Compost or recycle organic waste on campus or locally.
- Re-use (or donate for re-use) or recycle all inorganic waste.
- The Sustainability coordinator will conduct an educational campaign to reduce the amount of recyclables in trash to 0% and annual trash audits to assess progress.
- The Sustainability coordinator in conjunction with Facilities Services will renegotiate provided services with Waste Management to improve and expand the recycling program.
- Proper disposal of hazardous waste will be conducted by all departments.
- Facilities Services will assess the cost of installing air hand dryers in bathrooms.
- Conduct recycling surveys every Fall for administration/faculty/students to monitor progress on recycling projects.
- Encourage a review of the ecological footprint of faculty and administration travel. Promote alternatives to face-to-face meetings such as the video conferencing room available in Owens 103c and phone conference calls.
- The *OIT Landscape Master Plan* (Mayer/Reed Landscape Architects, 2007, p. 23) recommends adding "attractive, convenient recycling stations at building entries so that paper, cans, glass, and plastic wastes can become more of a habit and be more easily sorted for re-processing."

LONG-TERM GOALS (3-10 YRS)

- Seek and acquire funding for a feasibility study of building a black water digestion plant on campus. If OIT could acquire its own black water digestion plant for sewage treatment, OIT would be "off the grid" completely with the exception of natural gas use.
- Seek and acquire funding for a recycling center at OIT's Klamath Falls campus.

WATER

MISSION

OIT will conserve and reduce waste of water on campus as well as ensure that the water quality remains consistently high.

PAST AND CURRENT PRACTICES

- OIT operates two domestic water wells. Well #1 is the primary well and produces adequate water supply for most of the year by itself. Well #2 is used only during peak Summer irrigation times. These wells produce high quality water with the exception of a higher than permitted arsenic content. The arsenic levels are mitigated through the use of adsorption filtration devices located in mechanical rooms throughout the institution. The adsorption media, when changed, is land-fill approved.
- The entire campus irrigation system is automated and controlled through battery or A/C powered time clocks. These timers are scheduled to irrigate at night to reduce evaporation.

SHORT-TERM GOALS (0-3 YRS)

- Replace water fixtures in existing buildings with low-flow fixtures whenever possible.
- Ensure safe drinking water on campus by installing filters for arsenic in every drinking fountain and sink fixture on campus. Sink fixtures that do not have adequate filtration should be labeled, "Not for drinking."
- Consider letting the grass die (and hibernate) during the Summer.
- The *OIT Landscape Master Plan* (Mayer/Reed Landscape Architects, 2007) identifies the need for water efficient irrigation systems wherever possible and drought-tolerant and native or adapted plants should be used to reduce irrigation demands.

LONG-TERM GOALS (3-10 YRS)

- The *OIT Landscape Master Plan* (Mayer/Reed Landscape Architects, 2007) recommends treating and infiltrating storm water on-site and exploring the possibility of using treated wastewater for irrigation.
- Eliminate the need for irrigation with the exception of sports facilities.
- Consider rain water collection facilities and use of treated waste water for irrigation.

CONCLUSION

Establishing a culture and a mindset of sustainability will become increasingly important to not only for quality of life but also to the financial bottom line for many businesses and institutions. The urgency to accomplish this will increase as resources dwindle and funding challenges increase. Operating in any other than a sustainable manner will not be an option in the years to come. Many businesses are operating today in a much more sustainable mode than they were several years ago and green today means both green practices and additional benefits to improve fiscal health. Some of the benefits of executing the action items in this Plan are listed below.

- **OIT can be the first energy-independent campus in the world.** Benefits include reduction of long-term costs associated with energy consumption, branding opportunities, research and funding opportunities, becoming a frontrunner in combating climate change, and experiential education resources.
- **Reduction of long-term costs associated with waste disposal** by reducing consumption of disposable goods like paper, and by composting, recycling, and using products with longer life spans.
- **Reduction of OIT's contribution to resource depletion, global climate change, and environmental degradation.**
- **Regional or national recognition for unique operational features and programs.** Because of our technical emphasis, OREC, the Renewable Energy Systems degree, and our geothermal and solar resources, we are uniquely poised to capitalize on a growing awareness of and interest in sustainable living. OIT is uniquely positioned to be a leading campus in sustainable education and practices.

These visions outlined for the sustainability of the Oregon Institute of Technology in Klamath Falls, OR are a framework that can be updated and built upon. The OIT Sustainability Plan needs to be a living and inclusive document; everyone involved with OIT should have the opportunity to contribute to its mission or to change its mission when necessary. Additionally, OIT will require leadership, inspiration, and impetus from the Oregon University System and the OIT administration in order to implement sustainable practices and ideas. OIT has a set of very unique strengths in already having the Oregon Renewable Energy Center, the Geo-Heat Center, the Renewable Energy and Environmental Science degrees, and the Center for Health Professionals. Coupled with the natural resources of the Klamath Basin, OIT is poised to become a 'center for excellence' that combines our history of technological expertise, our command of the Health Sciences, and the challenge of renewable energy opportunities together on one sustainable campus that promotes these strengths and makes us a highly sought after institution.

REFERENCES

*American College and University Presidents Climate Commitment. (2008). *The Commitment.* Retrieved May 2, 2008 from: http://www.presidentsclimatecommitment.org/html/commitment.php

*Bland, M., Collins, J., Shadley, A., & Voils, J. (2003). OIT sustainability plan project. Unpublished study conducted by a Business Research Methods course at the Oregon Institute of Technology.

*Burket, B., Doane, J., Espelund, L., & Ochoa, N. (2003). Analysis of the OIT community and its use of Basin Transit Service. A study conducted by a Business Research Methods course at the Oregon Institute of Technology.

Chester, T. (2008). *Oregon Institute of Technology Sustainability Strengths and Activities.* Document prepared for the OUS Sustainability Summit, Portland, OR.

Emory University. (2008). The Piedmont Project. Retrieved June 3, 2008, from the Emory University website: http://www.scienceandsociety.emory.edu/piedmont/

*Goettel, D. (2008). *Getting Started: The OIT Local Foods Project.* Unpublished student technology report, Oregon Institute of Technology.

Lund, J., & Boyd, T. (2007). "Chill out"—Oregon Institute of Technology is a winner. *Geo-Heat Center Quarterly Bulletin, 28(2),* 16-18.

*Mayer/Reed Landscape Architects. (2007). *Oregon Institute of Technology landscape master plan.* Klamath Falls, OR: Oregon Institute of Technology.

Office of the Governor, State of Oregon. (2006, February). *Executive Order No. 06-02, Sustainability for the 21st Century.* Retrieved April 30, 2008 from http://governor.oregon.gov/Gov/pdf/eo0602.pdf

Office of the Chancellor. (2005, July). *AEED Recommendations to the Oregon State Board of Higher Education.* Retrieved April 30, 2008 from: http://www.ous.edu/state_board/workgroups/aeed/files/AEEI%20Recommendations.pdf.

*Oregon Institute of Technology. (2008, May). *OIT 2017: Strategic Plan.* Retrieved May 2, 2008, from the Oregon Institute of Technology website: http://www.oit.edu/oit2017

Oregon Institute of Technology. (2008, May). *Oregon Renewable Energy Center.* Retrieved May 2, 2008, from the Oregon Institute of Technology website: http://www.oit.edu/oit2017

Oregon Natural Step Network. (2008). Welcome to the Oregon Natural Step Network. Retrieved June 3, 2008, from the Oregon Natural Step Network website: http://www.ortns.org/index.htm

*Oregon University System. (2007). *Oregon University System Greenhouse Gas Inventory: GHG Emissions for the 2004 Calendar Year: Report and Analysis.*

Soderstrom Architects. (2004). *New Student Housing: Oregon Institute of Technology*.

US Partnership. (2008, April). *Homepage*. Retrieved April 30, 2008 from http://www.uspartnership.org

*Wills, B., Denton, L., Goosen, J., Spicer, J., & Perez, C. (2003). OIT sustainability and awareness. A study conducted by a Business Research Methods course at the Oregon Institute of Technology.

*These supporting documents will soon be available on OIT's Sustainability Website.