Sustainability Assessment

Clackamas Community College
Clackamas County, Oregon

Prepared for
The Sustainability Committee
& the interested campus community

in collaboration with
The Clackamas Community College Sustainability Committee
The Clackamas Community College Community
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by
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- American College & University Presidents' Climate Commitment (ACUPCC) Association for the Advancement of Sustainability in Higher Education (AASHE)
- Green Campus
- Green Schools, Brown University
- Higher Education Association Sustainability Consortium
- Public Sector Sustainability Coordinators, Portland Metropolitan Region
- U.S. Department of Energy, Office of Energy Efficiency

Preface

Thank you for your contributions to Clackamas Community College's sustainability achievements. Without your efforts, the many programs and practices highlighted here would not have been initiated. This assessment provides a current snapshot of the College's sustainable practices in three areas: campus culture, education and energy. The final chapter, *Opportunities,* presents ideas for future achievements and for development of a sustainability plan for Clackamas Community College.

Your review of this document is invited. Please refer to the table of contents to locate the subject areas that interest you and look them over to make certain they are accurate and complete. Please also look over Chapter IV, *Opportunities,* and note your additional ideas.

The hierarchy of headings in this document is organized as follows:

Chapter Heading
Major heading
Sub-heading
MINOR SUB-HEADING
Sub-sub-heading.

Comments, corrections and suggested additions can be emailed to martham@clackamas.edu. Please note page number and sub-heading or paragraph in your notes. Please provide corrections and suggestions in complete sentences for ease in editing.

Your review will help move this process forward to the next step: Creating a sustainability plan in which the entire college community is invested.

Thanks again!

Contents

Through education and action,
the Clackamas Community College Sustainability Committee
aims to assess, plan and implement strategies
for social, environmental and economic sustainability
on campus and in our larger community.

- **Sustainability Committee**
  Clackamas Community College

"There aren't a lot of arenas in which we can look back in 50 years and say, "That really did make a difference!"

- **Elizabeth Howley**
  Sustainability Committee Co-Chair, CCC

Sustainability:

"...meeting the needs of present generations without jeopardizing the needs of future generations - a better quality of life for everyone, now and for generations to come. It offers a vision of progress that integrates immediate and longer-term needs, local and global needs, and regards social, economic and environmental needs as inseparable and interdependent components of human progress."
- European Commission, 2006

"We can't solve problems by using the same kind of thinking we used when we created them."
- **Albert Einstein**

"If it can't be reduced, reused, repaired, rebuilt, refurbished, refinished, resold, recycled or composted, then it should be restricted, redesigned or removed from production."
- **Berkeley Ecology Center**

"The character of a society is the cumulative result of the countless small actions, day in and day out, of millions of people."
- **Duane Elgin**

"Little acts have big impacts."
- Martha Mitchell
Sustainability Coordinator, CCC

Introduction

This document provides an overview of the resource conservation, energy efficiency and sustainability programs, partnerships, coursework and activities developed, accomplished or underway at Clackamas Community College, so that the institution's sustainability and climate neutrality goals can be identified and actions planned and implemented.

Context for College Leadership & Action

*Energy Efficiency & Resource Conservation***.** Clackamas Community College provides regional leadership in sustainability by adopting and teaching environmentally, socially and economically sustainable practices. The college and has a long history of engagement in these issues – integrating sustainable practices into campus life and infrastructure, developing demonstration projects for campus and region-wide educational communities and developing curricula for diverse student groups pursuing professional, technical, career, academic and basic and continuing education. The campus community is resolved to do more.

The realities of climate change, resource depletion, the impacts of population growth and a global economic crisis have focused attention on the need to reduce the energy consumption, greenhouse gas emissions and carbon footprints of residential, commercial, industrial and institutional structures. In a report to the U.S. Senate Committee on Environment and Public Works, the U.S. Green Building Council reports: [1]

> *"In the United States, the built environment accounts for approximately one-third of all energy, water and materials consumption, and generates similar proportions of pollution."*

It has become common knowledge that buildings are the single largest contributor to carbon emissions, producing more than 40 percent of total emissions. Further,[2]

> *"In the Pacific Northwest, despite relatively abundant hydropower, nearly half of all electricity is from coal, natural gas and nuclear power plants . . . "*
>
> *"Because buildings last for many decades, efforts to reduce emissions from buildings need to address both existing structures and new construction. More than half the building stock that will exist in 2050 already exist today. For that reason, . . . seek to improve the energy efficiency of existing buildings."*

Clackamas County, Clackamas Community College, the state of Oregon, the Federal Department of Energy and indeed, municipalities and states throughout the nation are focused on making the largest reductions in energy consumption and building efficiencies through the adoption of green

[1] From US Green Building Council. Feb. 2003. *Building Momentum: National Trends for High-Performance Green Buildings.* Prepared for the US Senate Committee on Environment and Public Works.
[2] From City of Portland and Multnomah County, *Climate Action Plan, 2008.*

building standards and the re-tooling of heating, lighting, cooling, ventilation, insulation and water systems of buildings.

College Board's Renewable Energy Goals for the Academic Year 2009-2010. Current efforts to reduce the carbon footprint of the three college campuses and their infrastructures are being focused on increasing building energy efficiencies. The College Board has charged the Campus Services Department to:

- identify improvements to better control energy consumption
- undertake energy conservation demonstration projects
- coordinate to provide students with educational opportunities based on the college's renewable energy projects

Significant progress has already been made to identify and make improvements to energy efficiency at the College, as noted in the third section of this overview. To date, solar hot water serves Pauling, McLoughlin and Randall, and "smart" energy efficient components and direct digital controls for heating, ventilation and cooling systems have been installed in the buildings in which they were most needed. These efficiencies have allowed the college to save nearly $1 million in utility costs between 2006 and 2010.

Workforce, Career, Academic & Technical Education & Training. Concurrently, the College engages business and industrial communities in a continuing dialogue to learn what academic, professional and technical education and training are needed to support the region's economy and workforce. New curricula and courses for professional development in sustainable practices and renewable energy and other aspects of emerging green technology continue to be developed. These are summarized in later sections of this document.

The College community recognizes that through its education and training programs, it plays a significant role in furthering the economic well-being of every household and business in the district. The idea is that when everyone does better, everyone does better. When businesses thrive and people have access to training and education that allow them to make living wages, they are able to make choices that affect their quality of life.

Many quality-of-life choices center on sustainability: choices about maintaining family health and hearth; choices about spending on utilities and weatherization; choices about education and training; choices about employment in sustainable businesses that serve a vital economy. In its mission to provide the best possible choices for the diverse populations it serves, the College also offers a range of services to high school students, differently abled students, returning adult students, veterans, students whose native language is not English, students wishing to retrain in new fields, and those seeking certificates, AAS degrees or transferring to four-year colleges.

Sustainability in College Systems. Increasing demands for and shortages of water make it critical for institutions to take a careful look at water use, water waste and opportunities for water reuse. The campus community has goals for integrating greater sustainability into its water use, waste and recycling programs, purchasing, transportation, management of campus grounds and stormwater, and infusing new practices in all of these areas into the College's academic, professional and technical education programs.

I. Sustainability & Campus Life

There is a growing societal imperative to create more sustainable organizations, neighborhoods, regions, cities, agricultural systems, resource uses, manufacturing processes, energy production and utilization, and world-wide trade and transportation. Awareness of these matters is shifting civilization's very perspectives at a global scale.

The College community has been paying attention as sustainability issues have emerged. Campus champions have adopted practices, developed programs and created outreach events that have helped sustainable principles and practices to become part of campus culture and campus life. Chapters I, II and III of this document attempt to capture the ways in which sustainability already has been incorporated into the College. The College community celebrates these achievements and eagerly looks to a near future in which they can turn their many ideas, enumerated in Chapter IV, into successful projects. Chapter IV also proposes an outline for grouping those ideas so that effective working groups can carry them out.

Past & Continuing Environmental Protection Accomplishments. The College has a track record for reaching and achieving its goals in environmental protection and for protecting the health & safety of the campus community. The many natural resource protection and health & safety initiatives of the of the '70s, '80s and '90s have been incorporated into facility and grounds planning and maintenance, and have become standard operating procedures. Some of these procedures are listed in this document. For example, water resource protection forms a core strand in the College's grounds maintenance program, stormwater designs, science programs and in opportunities on campus for interpretive education in conservation and natural resources. Health & safety provisions can be seen everywhere, affecting such things as materials and locations of office furniture, fuel & material storage, tool handling, universal access and signage.

The Sustainability Committee. An active, campus-wide, interdisciplinary sustainability committee, established in 2007, has nurtured and supported a growing culture of sustainability at the College. Accomplishments and activities include:

- Developed a mission statement: *Through education and action, the Clackamas Community College Sustainability Committee aims to assess, plan and implement strategies for social, environmental and economic sustainability on campus and in our larger community.*
- Helped promote a Lectures in Sustainability series, beginning in 2006, supported by the Clackamas Community College Foundation, featuring visionary speakers in the sustainability movement;
- Assisted to promote Green Screen, a series of films highlighting topics in human/global ecology;
- Helped promote The Sustainability Project, a communication campaign highlighting current and progressive information for the campus community through various media, including a newsletter with a calendar of events;
- Initiated a waste audit, which resulted in the establishment of improved recycling stations in each building.

- Convened campus community members interested in sustainability to garner ideas and support initiatives such as Campus Services' energy efficiency program.

Executive Group

- Incorporated triple-bottom line considerations (environmental, economic and social justice) into the College's core values and performance expectations for the Campus Services division.
- Established priorities for and implemented a $373,000 Pathways to Sustainability grant (AKA "The Green Grant") from the Oregon Governor's Strategic Investment Fund in 2009 to support many activities to infuse campus culture with activities to enhance awareness of global climate and sustainability issues.

Associated Student Government (ASG). In 2008, student government launched a campaign to educate the campus community about the waste inherent in the purchase of bottled water, and lobbied for construction of water bottle filling stations on campus. The filling stations were installed. Students also participated in the waste audit and recommended a more comprehensive and easy-to-use campus recycling system. Collection stations were expanded and signage was updated. In other activities to support sustainable campus communities, the ASG:

- collects food for families in need
- administers grants for childcare
- oversees student clubs
- hosts a book exchange
- houses the lost & found
- hosts events for students and their children
- runs a grants program for textbooks
- provides housing information for students
- rents lockers to students
- provides access to a free phone for local calls
- stages public debates and discussions to raise awareness about ballot initiatives
- oversees the student portal on the college's webpage & network
- hosts a number of events for the college community

New Student Orientation. Beginning in fall term, 2009, new students received a broad orientation to the College's sustainability goals, community partnerships, achievements, practices (recycling, etc.), studies, and technical and professional offerings. Moreover, they were acknowledged for the sustainability actions they take in their personal lives and invited to contribute to the College's efforts.

Student Sustainability Initiatives Club. This club was launched in fall of 2009, and is planning several events around the topic of waste and recycling.

Athletics Department. Annually, the department uses approximately 100 cases of paint in aerosol cans to mark soccer fields and cross-country courses. The cans are aspirated and drained and recycled. The drained contents are collected in a 55-gallon drum and hauled away by an approved contractor.

The department is moving away from using disposable plastic and wire flags for marking XC race lanes, and instead, using more reusable, recyclable polyethylene flagging to mark lanes.

College News (Journalism Department). Students produce *The Clackamas Print* and *Clackamas News Online,* regularly covering sustainability goings-on around campus. Examples

include the "Green Grant" activities during academic year 2008-2009, the $2.8 million energy efficiency projects accomplished with various funding sources during the summer of 2009 and interviews with sustainability champions at the College.

Campus Communications. The public relations office posts updated information on the campus website about the activities of the Sustainability Committee. The department also collaborates with the publications office on text and page designs to highlight renewable energy and sustainability projects and ideas for special publications.

Environmental Health & Safety Programs. The College has a full-time environmental health and safety officer who oversees environmental compliance and several other programs. Programs that help to maintain sustainable campus life and practices are listed below:

- waste and recycling (construction materials, used furniture, paper, bottles and cans, scrap metal, etc.)
- universal waste management (batteries, televisions, computer monitors, CPUs, fluorescent lamps, aerosol cans, refrigerants, etc.)
- hazardous waste management (solvents, batteries, oils, paints, wastes from photo, science and chemistry labs)
- stormwater inlet cleaning
- spill prevention and response training and readiness
- hazardous chemical emergency response and spill cleanup
- guidelines for materials handling, storage and containment
- Campus Services Safety Team
- industrial hygiene surveys for toxic vapor, gas, dust or noise
- asbestos identification and monitoring
- fire and life inspections and fire extinguisher inspection and maintenance
- emergency evacuation training
- coordination for personal protective equipment selection and coordination of respirator fit testing and issuance
- injury/illness incident reporting
- safety complaint investigation and resolution
- safety training for departments
- ergonomic evaluations
- hazard communication and training for use of Material Safety Data Sheets (MSDSs)
- first aid supplies for laboratory classrooms

Water Resource Protection (also see Stormwater, in a subsequent section of this synopsis)**.** The Oregon City campus, on 164 acres, has an extensive passive stormwater detention and treatment system, which safeguards habitats for threatened and endangered cold-water fish in a watershed to which campus stormwater drains.

Just-in-Time Purchasing. To reduce hazards of materials storage (e.g. spills, fires) the College has reduced warehousing of goods and materials, and, as much as possible, practices on-demand purchasing. Purchasing of alternative, non-toxic, non-hazardous materials is encouraged.

Centralized Printers. The use of centralized printers in departments and work groups decreases energy use and may contribute to the College's efforts to decrease paper use.

Telecommuting. In an effort to reduce the air quality impacts of employees commuting to campus, College Board policy allows instructors, adjunct instructors, staff and classified employees to productively telecommute with supervisors' permission and a plan for regular communication. College email is accessible to campus personnel from their home computers.

Commute Options. A College Transportation Committee is working with regional transportation planners and public transit providers to explore alternatives to single-vehicle employee commutes. The committee is developing a pilot project and incentives for carpooling and is evaluating a shuttle between the end of the light rail Green Line and the Oregon City campus.

Technology & Smart Classrooms. Increasingly, coursework involves less paper as instructors use smart technologies to engage students in learning. Approximately 90 classrooms have technology – including computers, smart boards, InFocus capabilities and Turning Point systems that facilitate student interaction with learning materials in PowerPoint formats.

Flexible Scheduling for Students. The economic vicissitudes of the past few years have created urgent training and education needs among all sectors of the College's student body – from the unemployed to the employed, from traditional students to career changers, from accelerated learners to those wishing to improve basic skills, from technical education to lower division transfer, and from traditional technicians to green technology workers. CCC has responded by offering additional sections of classes, technical skills classes, such as welding, during late evening hours, and through accelerated basic skills courses in which an entire term's material is offered in a condensed format.

Reduced Commuting – Four-Day Work Week. In an effort to cut down on resources expended for commuting to campus, employees who maintain campus landscapes, facilities and infrastructures work 10-hour days, four days per week, year-round. This is in keeping with the county's sustainability scheduling, in which all employees work four-day weeks year-round. All College employees work four-day weeks in summer. Additionally, many instructors telecommute, and employees have access to their email accounts from home.

Library Services

Dye Learning Center. The acquisitions librarian has acquired and continually updates the Library's collection of books about sustainability. The interlibrary loan librarian has a special interest in sustainability and serves as a deep resource in this topic for faculty and staff. In summer, the Library operates on reduced hours. The chair of the department is one of the College's bike-to-work champions and is an outspoken advocate of sustainable lifestyle, with expertise in solar systems.

Clairmont Media Center. The Horticulture Division maintains an extensive collection of resources about crop growing, gardening, landscaping, good production and sustainability.

Food Services
Oregon City Campus. The contracted managers of the cafeteria minimize food waste by forecasting customer needs daily and adjusting amounts of prepared foods accordingly. Tomorrow's salads, sandwiches and wraps are made with ingredients at the end of each day. Prepared foods that are left over at the end of the day are sold at half price.

Condiments are provided in bulk containers. The cups that look like Styrofoam are actually biodegradable, and the plates for grilled food and sandwiches are manufactured from bamboo shoots. Managers are evaluating more sustainable containers for bentos and salads. New napkin containers dispense only one napkin at a time, minimize waste.

Kitchen staff rinses and recycles cans, cardboard and plastic containers. A recycling station is available for customers. A second recycling station is being planned.

Plans are being discussed to acquire more efficient kitchen equipment.

Harmony Community Campus. A coffee cart located in the student commons provides snacks and locally sourced coffee.

Wilsonville Training Center. The utility partners provide food service to their students at this location.

Purchasing & Financial Services. This department tracks and reconciles the College's budget, grant funds, purchasing, expenditures, receivables, payroll, Foundation accounts and student financial aid. The department also conducts internal audits and prepares for third-party audits. Data from departments all over campus concerning finance, enrollment & registration is input to a robust, fully integrated program, Datatel. From this data, personnel in Financial Services are able to prepare reports and financial information supplied to campus personnel, board members, state agencies and the public.

The paper and time-saving attributes of such a system are enormous. In addition, many standard forms are now available online and can be filled out, submitted and filed electronically. These include W2s, W4s, and various other documents. College employees also receive electronic receipts for directly deposited wages and stipends.

This department recently participated in the Lean training, and is making even further departures from the paper world. Financial Services is interested in future implementation of electronic check payment for vendors, students and employees; online approval, online signatures and other paper- and time-saving processes offered by Datatel.

Information Technology (IT). The robust Datatel system also extends to administration, allowing students to apply to the College, schedule basic testing, register, make payments to the College, apply for and receive direct deposit of financial aid funds, add and drop classes, check grades, review and order transcripts, and review the schedule of classes. The system software, hardware and auxiliary systems such as Blackboard and Moodle, are maintained by the Information Technology department.

The IT department replaces approximately 250 to 300 computers annually, bringing new computers into laboratories and classrooms. The computers removed from labs and classrooms are put into service in instructor and staff offices. Computers in this rotation provide service at the College for seven to eight years. Operating systems must be updated as the computers move through service. When the computers reach the end of their service life at the College, they are donated to schools. The department has a contract with a state-approved company to pick up and dispose of remaining surplus computers and technology.

There are a handful of labs that use mobile computers. Despite their lesser energy requirements, the department at this time does not favor laptops over desktops because they cost more, are more vulnerable to theft, are more difficult and costly to repair and have a shorter service life (five years).

Recently, IT has been working to put phones on the same network shared by laptop computers, desktop computers College-wide. Some area printers are connected to phone lines, allowing documents to be scanned and emailed from the printer interface.

Student email accounts are provided through Microsoft's cloud mail service. Moodle, a system for aggregating multi-media information, is coming. On the horizon is desktop virtualization, in which computing is transferred to a central processing system. Multi-point communication (desktop video communication) is on the horizon. A backup generator for the servers will be installed soon.

Streamlining Processes & Decreasing Paper Use

The Lean System. The campus community has embraced a method for evaluating time and resources to complete procedural processes such as registration. By carefully evaluating the range of activities and steps through which a process flows, processes are being streamlined, resources such as time and paper are being economized, and people have time for other tasks. Staff and instructors are being trained in the Lean system.

Blackboard. Faculty is encouraged to participate in workshops to learn how to post classroom materials online and incorporate digital and other computer-accessible media into their courses. The College is considering a migration to Moodle, a personal learning system that enables users to organize and store digital information from a range of media and platforms. A continued migration to on-line learning resources may support the College's paper and energy conservation strategies. However, additional study is needed to determine whether students actually use less paper due to the prevalence of electronic teaching and learning media.

Moodle. Personnel in Information Technology will soon be launching Moodle, a digital personal learning system that allows users to aggregate information from multiple media sources.

On-line Registration & Course Evaluation Forms. The processes of registering and paying for classes may be completed online, saving resources and time for students and administrative staff. Some instructors also provide an online course evaluation procedure.

Bookstore

EBOOKS, DIGITAL MEDIA & BOOK RENTAL. The Bookstore carries eBooks, for which students pay approximately 65 percent of the cost of a new hard-copy book. Many of these books have highlighting, note-taking and test-taking features. Used textbooks, when available, cost about 75 percent of new. The College is testing a book rental. Rental programs have been shown to be cost effective for both colleges and students for courses that are taught frequently over a minimum two-year period. The rental fee is typically around a third of the cost of new. Some courses require students to purchase access codes to websites on which study materials are posted. On-line courses are increasing, and many instructors assign readings from the Internet. The Bookstore keeps detailed records about both electronic and hard copy course materials for all classes.

PACKING MATERIALS & PLASTICS. The bookstore recycles all manner of hard plastics, packing films and packing materials, including Styrofoam.

Paper Conservation. The College continues to seek ways to decrease paper use:

- Campus Services has eliminated desktop printers and shifted to a multi-function central machine. Color jobs are sent by email to Printing and Duplication.
- The Computer Lab printer prints all jobs on both sides of the page.
- All College Council meetings are paperless. Written materials are viewed on laptops or a projector screen, and informational materials, agendas and minutes are posted on the council website.
- Mass mailings to students have been minimized and will continue to decline. Each student has a "My Clackamas" account on the campus network, where College announcements, important dates and reminders are posted.
- Staff no longer automatically receives printed payroll deposit statements, but may opt to receive, view and download statements from their "My Clackamas" accounts.
- The campus community receives instant, time-sensitive electronic "FYI" notices when booting up computers.
- People submitting requests to Printing and Duplication are encouraged to send PDF files, not hard copies.
- The default setting for machines in Printing & Duplication is double-sided.
- Printing and Duplication uses 100 percent recycled paper and purchasing decisions consider sustainable forestry.
- All paper waste (save for punched holes) in Printing and Duplication is recycled.
- Paper recycling bins are spotted throughout offices, classrooms and buildings.
- Printing and Duplication will save paper printed on only one side and give it to instructors who request it for scratch paper.
- Toner cartridges in Printing and Duplication are recycled.
- Staff in Printing and Duplication share a business card.
- The College is working to improve electronic technologies that will make the registration process more convenient for students and administrators and eliminate paper from this process. Many College forms, including purchase orders, are available on the College website and can be filled out and submitted electronically.

- An automated email system now informs the campus community of campus closure due to weather or other emergency.

Students in ASG will soon be having a work session to discuss how to query students about how they use digital class media: Do they read it on screen or print it? If they print it, are they printing it at home or at the college?

Mail & Deliveries
Curtailed Summer Services
- Mail delivery and pickup on the Oregon City campus during summer are restricted to four days per week.
- Deliveries by courier to the Wilsonville and Harmony campuses are restricted to three days per week.
- Warehouse deliveries to all campuses are made on Tuesdays and Thursdays.
- Bookstore deliveries are made daily only at the start of term.

Services during Fall, Winter & Spring Quarters. Delivery and pickup of mail and packages return to daily service due to staff demand.

Campus Shipping & Receiving. Shipping and receiving occur on a level, paved pad in a covered bay in an area distant from the campus's main vehicular and pedestrian activities. Two labeled, ten-gallon buckets of spill response materials are kept within sight of goods being loaded and unloaded. All shipping and receiving activities are recorded, and records of this chain of custody are filed and maintained. The employees who handle and deliver the received goods have current training in forklift operation and spill response. Paper shipping materials are recycled.

An uncovered, sub-grade loading bay is adjacent to the receiving pad. The storm drain inlet in this bay is plumbed to an adjacent vegetated area to which drain water may be pumped when the sump fills.

College Fleet
Motor Pool. Four 15-passenger vans and a 15-passenger bus are available for general use by campus personnel. These vehicles are maintained by off-site certified technicians (see below). Detailing and inspections are performed by campus departments.

Driver Education Vehicles. A pool of 22 driver education vehicles is maintained by certified technicians who rotate tires, change fluids and filters off site and provide other safety related routine maintenance. College personnel do not handle motor oils, solvents or other materials associated with maintenance of driver education vehicles. The vehicles are washed at the College's covered wash facility or at an off-site commercial facility. They are parked at secured locations in the region where driver's education instructors will be working.

Geographic positioning systems (GPS) have been installed in all driver education vehicles. The whereabouts of each vehicle can be tracked, cutting down on unauthorized mileage. Idling time

can also be tracked. Drivers of vehicles whose GPSs record high idle times are contacted with information about the importance of protecting air quality by reducing or eliminating idling.

Campus Services Fleet. Used vehicles are purchased for the maintenance crews. The Air Quality Division of the Oregon Department of Environmental Quality gives the College credit for changing older vehicles out for newer ones with cleaner combustion and more efficient mileage. Fleet vehicles include two SUVs a small bus and a variety of work trucks.

Automotive Fleet. This group has a small pickup and a flatbed.

Bookstore Fleet. The bookstore has a van.

Equipment. The College owns three propane-powered forklifts (Warehouse, Automotive and Welding) two tractors (Grounds and Horticulture) and a Bobcat (Horticulture). A fourth, battery powered forklift, is assigned to the Warehouse.

Rental Vehicles. Enterprise Rent-a-Car provides additional vans as needed.

Fueling

- Campus Services keeps a spare 7-gallon tank of propane on site for the forklifts. This is swapped for a new tank as needed. This spare is stored in a regulation flame-proof metal cabinet in the warehouse.
- Spare gasoline for small gas-powered maintenance equipment is kept in a regulation flame-proof cabinet in the maintenance building.
- Spare gasoline for small gas-powered horticultural equipment is kept in a flame-proof cabinet in the brown barn in the Horticulture area.
- Two thousand gallons of regular gasoline are kept in an above-ground tank in the southwest corner of the northwesterly asphalt parking lot of the Clairmont complex. The tank is double-walled, to provide secondary containment in the event of a leak, as required by the local fire marshal and by federal and state regulations. The area around the tank is hachured with wide white painted bars and is protected by bollards. The former underground tanks were removed around 1992.

  Drivers fuel the vehicles they are using. The pump has a vapor return mechanism, a gauge to monitor leakage; a manual emergency cut-off switch for the pump and a breakaway valve that closes in the event of breakage - all required by fire code. The tank and area are signed: Flammable; No Smoking; Turn off Engine.

  Emergency spill response materials, including absorbents and a storm drain cover, are kept in the Lewelling building. Additional spill response materials are kept in the Automotive and Manufacturing areas.

Facilities Engineering & Maintenance

Materials and Best Management Practices. The facilities maintenance department has incorporated dozens of measures to safeguard both human and environmental health, through sourcing and use of environmentally friendly materials in furnishings, finishes and maintenance and cleaning supplies. Personnel in this department repair, remodel and refinish campus facilities to maintain a safe and comfortable environment for students and the College community. Toward this end, only water-based latex paints are purchased, and only in quantities sufficient for immediate use. Paints are no longer purchased in quantity so there is no need to recycle or dispose of deteriorated paint, and potential fire hazards are avoided. Paint colors are selected from a menu of 10 complementary colors, so that paint is easily obtained for touch-ups and left-over paint can be used for another project. Only low and no VOC (volatile organic compounds) glues and spray adhesives are used. The painting projects accomplished with Stimulus funds in summer ’09 utilized a local paint vendor and its line of no-VOC paints.

The entry way carpets selected for campus-wide use are manufactured from recycled plastic drink containers. As much as possible before making purchasing decisions, personnel evaluate carpeting and upholstery for the eco-friendliness and stability of their materials. The College maintains relationships with eco-friendly suppliers, whose representatives keep maintenance informed of new materials.

Reuse & Repair. Parts, used furniture and materials for repairs and are stored in a building that is no longer used for classes. Here, maintenance staff rebuilds locks, re-sizes doors and retrofits furniture for reuse. Used furniture no longer needed by CCC is given to schools in the greater metropolitan area.

Water Conservation. The College’s newer buildings have auto-flush toilets that utilize only 1.6 gallons of water with each flush. Older restrooms are retrofitted as funds are available and where older plumbing infrastructure allows. Each auto-flush mechanism is powered by four C batteries that are changed every two to four years, as needed, and recycled. The College is also installing a water reclamation system in the welding lab.

Sustainable Buildings. Managers in Campus Services have begun a project to develop flexible specifications for sustainable building design & construction. Under consideration are guidelines for indoor air quality & ventilation, universal access, windows & entry way designs, roof materials, passive lighting, heating, cooling, ventilation, and water use, conservation, metering & sub-metering, cleaning and process materials, and finishes and furnishings

Custodial Services

RECYCLING. Comingled collection of recyclable materials is practiced at the Oregon City and Harmony campuses. The Associated Student Government locates special containers in strategic places on the Oregon City campus to collect deposit-only drink containers so that they can redeem the containers for cash.

Recycling stations are located near the entrances of buildings and in dining and break areas. Custodial staff manages the recycling stations and also hand-sort selected recyclables from trash deposited in campus garbage bins. The College-wide recycling

system continues to reduce the cost of waste disposal. In addition, the purchase of a trash compactor in FY 1997-1998 enabled the campus to change from frequent vendor pick-up of 2-yard bins to once-a-week garbage pickup. This caused a marked reduction in annual cost of waste hauling and disposal, and this cost continues to go down.

At the Wilsonville campus, recyclable materials are still collected in separate bins, according to material, because that facility's recyclables are hauled by a different company that, until recently, did not comingle recyclables. The hauler now commingles recyclable materials from the campus.

Campus Services is beginning a pilot project to collect and recycle plastic films.

Styrofoam, hard plastics and wrapping films from Bookstore operations are taken by an employee to regional collection centers.

The College coordinates with its recycler and a representative of Clackamas County's Clear Stream Program to provide large events on campus with special collection containers for recyclables.

Scrap metal from Campus Services, the Automotive, Machine and Welding shops is collected and purchased by weight. Some of the metal is given to the company that provides the large drop for it. Proceeds from sale of scrap metal go into the general fund in some cases and back into the department funds in others.

The College purchased a trash compactor in 1998. This has allowed us to cut our garbage costs by 85 percent. Our annual cost for garbage disposal continues to go down as we recycle more.

CLEANING. The custodial department purchases Sustainable Earth chemically neutral cleaning products from a local vendor that specializes in water-based, soy, citrus and other non-toxic products. The department purchases only the supplies immediately needed, so that no products or cleaning agents are warehoused. The vendor provides one-day delivery service.

Four types of cleaning products are used: floor cleaner; a stronger, more alkaline cleaner for tables and counters; a cleaner for glass, chrome and mirrors; and a disinfectant for restrooms and classroom tables. On the Harmony Community Center campus, only Green Seal products are used.

The paper towels in campus restroom dispensers are locally produced with 100 percent recycled material by a minority owned company.

The custodial group no longer wipes down door handles and telephone handles. The frequency with which offices are cleaned and waste baskets emptied has been reduced from daily to once per week due to staffing and budget constraints. Staff are responsible

for emptying their own office trash and recycling into larger collection receptacles in each building.

Campus Services has purchased a brand of flooring that requires only water to maintain. There is no need to use wax or strippers. The machinery to maintain these floors can be used on other flooring materials as well, and the pads last twice as long as long as pads formerly in use.

Grounds Keeping & Landscape Maintenance. Groundskeepers maintain and oversee approximately 200 acres on the College's three campuses, including:

- turf
- perimeter fields and natural areas
- athletic fields
- ornamental landscape plantings
- sidewalks & hardscapes
- soft-surface trails
- community gardens
- the Environmental Learning Center, a community center focused on environmental education, located in a restored natural area in the headwaters of Newell Creek
- several somewhat disturbed native habitats, including forested wetlands at the headwaters of Newell Creek and the creek's riparian corridor, as well as remnant closed-canopy Douglas fir forests and oak/shrub habitats. Each of these is identified in landscape documents prepared by the College Grounds Committee. Some also are mentioned in the College's master plan.

The larger patches of native vegetation on the Oregon City campus are managed for habitat and native ecosystem preservation. The campus master plan calls for increasing the dominance of native vegetation toward the periphery of the campus as the distance from the clustered buildings increases. Wildlife needs are considered along with local fire department requirements in the development of mowing schedules for turf and fields near these natural areas.

Within the bounds of budget constraints of safety and security needs, the grounds keeping program generally adheres to the principles of an Integrated Pest Management Program. Groundskeepers spot mow and apply herbicide on a limited basis. Herbicides used are those for which the longest studies have been done and which have the highest safety ratings by the Oregon Department of Agriculture and the US Fish and Wildlife Service. Herbicides are purchased as needed and used up at the time of application to avoid bulk storage. Just-in-time materials are stored in an approved chemical storage structure.

The bulk of turf maintenance and herbicide and fertilizer application is contracted to vendors. Depending on turf or field, level of manicure, proximity to buildings and public safety needs, grass clippings are broadcast during mowing or taken to the horticulture composing area.

In 2009, watering ceased in all turf areas not actively needed for sports. Only the planting beds and active athletic fields are watered, and only as needed. This action has resulted in a decreased need for mowing as well as considerable water savings during the College's highest water use

months in summer and early fall. Grounds Keeping is approaching an absolute minimum use of irrigation water, using only the amount needed to maintain new plants.

Other sustainable landscape maintenance activities include:

- The new Harmony campus has irrigation controllers wired to a rain gauge and an evapotranspiration meter. The controllers can be programmed, and they have sensors that shut down area irrigation in the event of line breaks, leaks or rainfall.
- Also at the Harmony campus, rain water harvested from the roof waters native bunchgrasses and rushes and is infiltrated on site.
- Groundskeepers implement a limited, prioritized program to control invasive, non-native plants.
- There are native species plantings in a large courtyard at the Pauling Center.
- Vegetation in stormwater swales is maintained.
- There is a welcome planting of flowering perennial plants along the campus jogging trail at the main entrance to the Oregon City Campus.

Stormwater

Oregon City Campus. The campus is located on flat to gently rolling uplands in the headwaters of Newell and Caulfield creeks, small urban watersheds. Of the 164 acres comprising this campus, more than two-thirds (68 percent) are landscaped vegetated, and a minimum of two-thirds of the total campus acreage is required by the master plan to remain undeveloped and in a vegetated state. Stormwater from 51 acres of hard surfaces is managed, both in passive stormwater swales and ponds and in piped infrastructure.

Most of the buildings are clustered in a central location with native and ornamental landscape plantings and scattered trees in immediate proximity to the buildings. This core area of buildings is connected by a series of impermeable-surface walkways, breezeways and plazas which are surrounded by asphalt surface parking lots.

At a distance from the core area and parking lots are turf playing fields and lawns, shrub clusters, mown fields, scattered native and ornamental trees, remnant upland and wetland forest ecosystems and planted areas associated with the Horticulture Program. The remnant forests, some of which are not College properties, are protected by Oregon City's Water Quality Resource Area overlay zone.

Stormwater is piped from the western portion of the campus to a stormwater main in Hwy. 213 that discharges to Caulfield Creek. Stormwater from the adjacent Oregon City High School campus is piped from a detention facility to the headwaters of Newell Creek in the Environmental Learning Center (ELC). Also contributing stormwater to the headwaters of Newell Creek are drainage from a portion of Beavercreek Road and drainage from the eastern portion of the campus and its several seasonal detention ponds. Ponds in the vicinity of the ELC are protected by Oregon City's Water Quality Resource Area overlay zone.

Mitigation for construction of new buildings on campus resulted in the construction of a series of detention ponds and bio-swales to filter, infiltrate and detain stormwater. These facilities are at capacity and, during extreme runoff conditions, they overflow or back up. The 2007 Concept master plan calls for an integrated master stormwater plan that achieves "no net increase" and incorporates eco-roofs, downspout-fed rain gardens, permeable pavements, reconstruction of the ELC ponds and development of infiltration and detention facilities in the core area that, combined, will result in no net increase in downstream discharges from the campus and improved water quality discharged from the campus.

A section of open-graded, permeable asphalt has been installed in the handicapped parking area behind the Gymnasium. Campus Services personnel are monitoring it to evaluate the potential for replacing traditional paving with permeable pavements to minimize stormwater runoff. A section of open-graded asphalt on the campus loop trail is also being monitored.

The Oregon City campus has 39 stormwater inlets that receive runoff from campus parking lots, roads, walkways and other impervious surfaces. The stormwater system is a component of Oregon City's National Pollutant Discharge Elimination (NPDES) permit. Area storm drainage is routed to ponds that serve to detain flows, retain sediments, and, in some systems, provide biological uptake of pollutants.

All flows that outfall from the College ultimately enter the headwater zones of live streams. One, Newell Creek, provides habitat for anadromous fish. In February of 2010 the Greater Oregon City Watershed Council completed an environmental assessment of local watersheds, including Newell Creek. Recommendations for habitat improvement are included in this document.

Stormwater catch basins on campus are suction-cleaned by a contractor. In the bus turn-around area, catch basins are fitted with oil-filtering inserts to prevent or minimize spills of diesel, oils and fluids from entering the storm drain system, which ultimately drains to Caulfield Creek. The filters are supplied by Tri-Met and maintained by the campus environmental health and safety officer. Oil-water separators may be installed when key catch basins are replaced.

Harmony Community Campus. Stormwater from the new Harmony building is routed into planter boxes where rushes and other native plants thrive. The parking lots drain to outfalls on the slopes bounding the Mt. Scott Creek valley directly to the south.

Wilsonville Training Centers. The outdoor impermeable surfaces at the Wilsonville campus drain to 10 catch basins.

Commuting

College managers are evaluating options and incentives to reduce the number of single-vehicle trips made to the College. A pilot shuttle project was implemented spring term 2010. The shuttle provides free round-trip service between the end of the light rail line at Clackamas Town Center to the Oregon City campus and to Clackamas County's Red Soils campus. Clackamas County and Metro are funding partners. The shuttle is free and open to the public.

II. Education for a Sustainable Future

Environmental Literacy and Oregon's Sustainable Future (placeholder for Alison Heimowitz).

Community Need for Education in Green Sector Jobs. According to WorkSource / Oregon Employment Department[3], nearly one-third of Oregon's 51,402 "green" jobs in 2008 required a special license or certification. Green jobs are defined by the agency as:

- increasing energy efficiency
- producing renewable energy
- preventing, reducing or mitigating environmental degradation
- cleaning up and restoring the natural environment
- providing education, consulting, policy promotion, accreditation, trading and offsets, or similar services supporting the above activities

Professional Development. The College offers a range of short- and long-term professional development opportunities for people working in green sector jobs. The forms, delivery systems and timing are based on assessed needs of a business or an industry. Courses and workshops are offered to individuals, businesses, business consortia and employers in both public and private sectors.

Clients range from rural to urban, very large companies to very small organizations, high tech to low tech. Community partnerships are myriad, including Clackamas County, Oregon Energy Trust, Association of General Contractors, Northwest Hydrogen Association, PGE and others.

The Customized Training group at the College convenes key industry representatives for mini-summits to identify specific job skills their employees need to be successful. The group also connects industry to workforce partners with access to potential workers. These partners include Oregon Employment Department, WorkSource Clackamas and the College's Workforce Development Department.

The College then provides resources to develop targeted training to meet business and industry needs. Key industries for which the College provides contracted education services include:

- manufacturing
- transportation
- utilities
- sustainability
- high technology
- agriculture & natural resources
- landscaping
- healthcare
- human services
- construction / deconstruction
- retail
- public / non-profit
- professional services

[3] See Bibliography entry under Oregon, State of.

As a result of this deep connection to community workforce needs, the College has provided and continues to provide customized training for employers and industry in collaboration with numerous funding and technical partners. For example, in 2009, the Professional Development group convened a group of business owners and managers engaged in deconstruction to learn their needs for training employees and for information about where to recycle salvaged building materials.

In addition, the College seeks and receives grants to provide technical and professional "bridge" training programs for employed, unemployed, under-employed and newly employed workers. These programs provide opportunities for workers to add certifications to their existing competencies, licenses or certificates. In many cases, such programs have extended traditional craftsman, journeyman and professional skills into the realms of sustainability and renewable energy. For example, an electrician might obtain new certifications in photovoltaic and light emitting diode systems or other new electric technologies, and thus gain more marketable skills in Oregon's green economy.

Collaboration between the College's Professional Development Department and the Career and Technical Education Division has delivered 114 customized training programs to the region's manufacturing sector alone. The role of professional development in supporting new sectors in the region's expanding green economy is clear. Because most training takes place at the employer's place of business, transportation costs and impacts of providing this education are minimized.

The college's department of Customized Training & Development Services is working with Energy Trust of Oregon to implement a water conservation curriculum for plumbers. A sampling of other training workshops for professionals that touch on sustainability and/or extended professional certification include horticulture & landscape management; electronics and microelectronics systems technology, water and environmental systems technology and high-purity water production.

Technical Career Education/Renewable Energy. This division works with technical advisory committees to continually adapt curricula to reflect changing practices and technologies in the workplace. These discussions include the professional development needs in the green, renewable energy and sustainability sectors of the workforce.

In 2008 the division worked with its technical advisors to develop a curriculum (currently under review by the state), for ASS degree programs in a Renewable Energy Technology and Energy & Resource Management. Related curricula and course modules in the division concern alternative fuels, maintenance of hybrid vehicles, solar, photovoltaic and wind energy, as well as a general overview of geothermal energy. In addition to more traditional professional technical skills, the program encompasses electricity, electronics and microelectronics.

Other related accomplishments of the division concerning renewable energy education include:

- A new Utility Apprenticeship program began in fall of '09.
- Also in fall of '09, enrollment in Utility Workforce Readiness Pathways Certificate program and the Energy Resource Management AAS degree program increased by 250 percent.

- The Manufacturing Department is partnering with Oregon State University to fabricate prototype parts for wave buoys.
- Under a partnership with the Oregon Institute of Technology (OIT), CCC students are able to earn a transfer degree to continue in OIT's degree in renewable energy engineering.
- The advisory committee redirected some grant funds to support development of five new renewable energy courses, their accompanying labs and lab equipment.
- A new course, Renewable Energy Systems, was developed and two full sections were offered in spring 2009.
- A new course, Alternative Fuel Systems, has been developed and was offered for the first time in fall 2009.
- Two automotive faculty attended hybrid training.
- The automotive program is developing a specialty in hybrid vehicles and key faculty in this program have received specialized hybrid repair training. They are now working with Toyota to develop a hybrid component of the automotive maintenance curriculum.
- The Automotive Technology program, like many of the College's other technical programs, serves as a living lab in which the institution's commitment to environmentally friendly and resource conservation practices are infused, as noted below.

Automotive Technology. Students are trained in laboratories that employ U.S. Environmental Protection Agency (EPA) and Oregon Department of Environmental Quality (DEQ) standards of practice to safeguard both human and environmental health. The Automotive lab will soon become a DEQ training site.

The department has an extensive recycling program and students are trained to avoid waste when mixing paints and using materials. Listed below are the department's primary practices that support a sustainable automotive industry.

- Petroleum-based paint thinners are recycled on site and the residual sludge is baked into wafers that are collected by a contractor and burned to produce energy.
- Water-borne wastes from automotive paint finishes are recycled back into the paints.
- Metal scrap is sold and the proceeds are used within the department.
- Spent oils, anti-freeze, other fluids and used oil filters are recycled.
- Students' first class in this department addresses personal protection, spill prevention, response and cleanup and hazardous materials handling.
- Spray booths are used, and these are calibrated according EPA specifications.
- No steam cleaning is done.
- Vehicles are washed with cold water in a covered facility on a concrete pad. The solids vault below is suctioned by a contractor as needed. The handle that works the water valve must be signed out by anyone using the wash facility.
- There are no floor drains in the shop. Rinse water from floor washing is collected in a sub-grade vault and serviced by a contractor.
- Vapor hoods are used on parts washers.
- Maintenance fluids are stored in fire cabinets. Empty containers must be turned in at the parts store in the automotive lab when fresh containers are purchased. The empties are recycled.

- Empty aerosol cans are taken to the campus environmental health and safety officer, who manages hazardous wastes.
- Students take a course in alternative fuels.
- The department offers a special course in hybrid vehicle repair.

*Interdepartmental Collaboration on Education for Renewable Energy***.** The College takes seriously its role in the community as a leader and exemplar of sustainability, and is striving on many fronts to retrofit campus facilities and infrastructure for greater energy efficiency[4], to create innovative solutions for renewable energy production, to reduce consumption and waste and to provide examples of sustainable landscape management.

On the academic side, the Technical Career Division – which has developed new certificate and degree programs in Energy Resource Management and Renewable Energy Technology – is now collaborating with the Division of Science, Business and Mathematics to infuse courses in these disciplines with appropriate knowledge, skills and abilities concerning sustainability. This effort will assure that students in energy programs will engage in pertinent learning in the earth sciences, physics, chemistry, biology and quantitative analysis related to their career objectives.

Demonstration Projects, Project Development, Prototype Manufacturing

- Plans are underway to install a vertical wind turbine and solar panel array on a campus rooftop, with a readable panel mounted at pedestrian level for students and community members to observe. This installation is expected to produce enough power to run an overhead pole lamp.
- An instructor designed and developed a wind turbine from two-litre pop bottles and PVC pipe. This project garnered the attention of Clackamas County personnel, who asked to borrow the display. The College then applied for and received a grant to fund a build-your-own wind turbine workshop series.
- Students in the manufacturing program are building prototype components of wave energy turbines being designed by Oregon State University engineering students. The College hopes to expand this kind of partnership to provide real-life manufacturing education and service to the industry as the region's renewable energy sector grows.

Weatherization Installer Training

- Short-term weatherization training was offered in spring of 2009.

Gateway to Renewable Energy Education for High School Students

- Work has begun with Gladstone H.S. and the Oregon Institute of Technology to offer renewable energy instruction for high school applicants to AAS and bachelor's degrees.

*Training & Education in Utilities & Energy Resource Management***.** The College's Wilsonville campus provides training and education in partnership with PGE and PacifiCorps. Workers in the utility field pursue training here and the College offers the following programs:

- Utility Workforce Readiness Career Pathway Program: Two-term certificate

[4] Greater detail on the College's energy efficiency undertakings is provided in Chapter III of this document.

- Energy & Resource Management: One-year certificate & AAS degree
- Utility Pre-Apprentice: Line Worker – One-year certificate
- PSU Transfer Agreement

The division is initiating a renewable energy field laboratory, planned to include solar photovoltaic panels, a vertical wind turbine and a wind turbine blade repair facility.

Community Partnerships / Business & Industry. The College has a long history of nurturing regional business and industry partnerships through its strong Apprenticeship and Professional Education and Workforce Training programs. Consistent service to the larger community in these respects has garnered the College more than 165 professional education partners and many joint partners in research, development and work experience. Members of the business and industry community serve on the College's advisory committees, together with subject experts, of whom many provide expertise as adjunct instructors.

Primary partners in renewable energy include:
- PGE
- Energy Trust of Oregon
- PacifiCorps

Academic Instruction. All departments and student learning services at Clackamas Community College are looking at additional opportunities to integrate sustainability into curricula. Past and current activities in this regard are briefly summarized below.

Renewable Energy Demonstration Projects. Academic department deans share a common goal to implement renewable energy projects on campus, and to integrate the embodied principles and technologies of these projects into interpretive kiosks in pedestrian areas and into coursework, curricula and classrooms campus-wide.

Arts, Humanities & Social Science. The articulation of sustainability goals for the campus gained early momentum in the College's Arts and Social Science Department, where campus-wide dialogue began about resource use, human behaviors, campus life and the need for cultural change. This ultimately inspired shifts in the College's waste management and recycling systems and was the catalyst for the founding of the College's Sustainability Committee in 2007.

The Sustainability Committee inspired the College to join the American Association of Sustainability in Higher Education and to take advantage of its resources, including assessment protocols. The committee continues to serves a vital role in generating and maintaining campus-wide interest and engagement in a wide agenda of sustainability initiatives.

> PATHWAYS TO SUSTAINABILITY. Today, the Arts, Humanities and Social Science Department offers a three-course, 15-credit series, Pathways to Sustainability. The classroom activities are modeled on the Socratic method, with students exploring the topic of sustainability through reading, analytical thinking, writing, discussion and

inquiry. The goal of the three-course series is to foster critical thinking, communication, appreciation for the diversity of human experience and the development of social ethics and responsibility. The instructor serves as a facilitator to engage students in the exploration of ideas, and students earn a grade on the basis of their own evaluation of their ambition, commitment and engagement in the course. This hybrid course provides a deep overview of this growing field and serves as a gateway to other courses offered in science, manufacturing and technology.

LECTURE SERIES FOR CREDIT. The Sustainability Committee is developing a lecture series on topics in sustainability that students will be able to take for credit.

ART CENTER. The use of barium, a heavy metal used in glazes, has been discontinued in the ceramics labs. The drainage systems in the ceramics lab sinks have been modified to strain larger clay solids and to filter clay particles. Un-fired clay is recycled. Ventilation hoods have been installed in the areas where fine glaze and plaster powders are handled. Spent photo developing chemicals are collected and picked up by a vendor for disposal. Oil-based paints have largely been replaced by acrylics.

Business, Math & Science. Undergraduate research is alive and well in selected science and technology classes, where it is incorporated into curricula in place of cookbook lab assignments. Students contribute to long-term data sets by applying new technologies to campus environments. They later gain opportunities to analyze and model these "real-life" data sets to make recommendations based on their findings.

WATER ENVIRONMENT SCHOOL. The Science Department puts on an annual "Water Short School" for people who manage and maintain sewer, wastewater and stormwater systems. Concurrent short courses in a wide range of topics are taught by industry experts over several days. The program is widely attended by municipal and state employees from every region of Oregon.

SUSTAINABLE BUSINESS COURSE. In spring 2010, the Business Department will be piloting a new, 1 credit course, BA199 "Sustainable Business". This course provides a balanced look at the impacts of adopting a sustainable approach in business. Course topics include sustainable sourcing and production strategies; cradle-to-cradle manufacturing, measurement and reporting strategies; responsibilities to stakeholders and the changing role of business in society.

COMPUTER SCIENCE. In a process dubbed *Go* Print, students using the open computer labs are allotted a certain number of pages they may print on the central laser printer. Page allotments are made on the basis of the student's credit load. After sending their selections to the central station, students must enter their identification number and confirm the print jobs they've sent to the printer. Staff observes that this second step – signing in and verifying that they truly want to expend page allotments – has reduced the amount of printing being done in open lab printers.

Survey of Computing. This basic computer literacy course typically has 12 sections and enrolls the greatest number of students of any single class offered at the College. It has been re-designed as a paperless course. The new book was co-authored by several people in the Computer Science Division and Chapter 1 is about sustainability.

HORTICULTURE PROGRAM. Nursery products comprise Oregon's principal export and the College's horticulture programs provide regionally significant education and training to the nursery, greenhouse and landscaping sectors of the region's horticulture industry. The principles of environmental stewardship are embodied in horticulture education where, through their work and studies, students care for both human and ecosystem health by caring for the earth, soils, plants and crops.

In keeping with the College mission, the Horticulture Department provides quality education and training for industry and community members. Course offerings in Greenhouse, Landscape, and Nursery Management integrate technical knowledge, practical skills, and environmental stewardship.

As students gain knowledge in the scientific underpinnings of horticulture, they are inspired and empowered to sustain their families, their communities and the businesses in which they work as interns, and later, as employees. Through their application of sustainable business practices, waste is minimized, materials are reused and repurposed, the local economy is supported through sourcing and purchasing, soil is safeguarded and water and energy are conserved.

The Horticulture department works with a consortium of Clackamas River water providers to provide the community with a wide range of workshops that demonstrate water conservation practices, from selection of low water use plants and use of mulches, to irrigation equipment with remote digital control systems.

This department has extensive ties to the community. In the past decade, students have held internships with 192 different nursery, greenhouse and landscaping businesses in the region. In addition, students are supported by diverse scholarships from the regional horticulture community and beyond.

The programs continually incorporate sustainable practices into campus demonstration projects that serve diverse community education audiences. These include:

- students in Horticulture and Landscape certificate and programs
- visiting K-12 audiences
- Metro community outreach workshops for the public
- Area garden clubs

Demonstration projects

- Water-Efficient Demonstration Garden (mulches, irrigation systems, low-water-use plants, dry shade garden, edible garden, native garden, Pacific Northwest garden)
- a composting demonstration area

- an eco-roof demonstration
- a perennial rose & herb garden with organic practices
- the organic, All-America Vegetable and Flower Gardens, including The Organic Insectary Display

Volunteers constructed an additional greenhouse for a year-long workshop in growing edible, organic crops year-round. The workshop began fall term, 2009.

Environmental Learning Center (ELC).
This education outreach program to the community is housed under Horticulture, in the Science Department. The center has two part-time faculty who receive support from a variety of partners region-wide to bring environmental education to students in kindergarten through twelfth grade. The ELC's education focus is water, watershed health and watershed management. Located in the headwaters of Newell Creek, the ELC is at the gateway to Newell Creek Canyon, which possesses some of the region's most significant spawning habitat for coho salmon and steelhead trout. Faculty leads field trips at the site and takes programs into classrooms.

Instructors also provide professional development education to teachers, helping them become better environmental educators by developing their skills to facilitate inquiry-based learning and critical thinking for informed decisions on ecosystem management. Faculty at the ELC worked with funds from the National Science Foundation to develop a degree program to train students to become environmental educators. This program will articulate with Oregon State University's teacher education program. This environmental education for educators program has not been launched at Clackamas Community College.

Interdepartmental Collaboration. The Business, Math & Science Division will be collaborating in Academic Year 2009-2010 to integrate basic education in these disciplines for students who will be going on in renewable energy fields. Instructors will be engaged in a process to evaluate sustainability modules that can be incorporated into existing courses. The Business Department has developed a new course, Sustainable Business, which will provide a balanced look at the short- and long-term impacts of adopting a sustainable approach that includes cradle-to-cradle considerations and triple-bottom-line accounting (people, planet, profits).

Distance Learning. Distance learning opportunities fill a need for flexibility in scheduling that today's busy students need. Approximately 6.6 percent of the 34,170 enrollments in transfer-level course sections in fall 2008 were for distance learning sections. Students who cannot attend College full time are able to take some courses online, or take an additional course that otherwise would not fit into their schedules. The availability of distance learning options supports the community's education needs and at the same time, may reduce paper use, and reduces building energy use and resources used to drive to and from the College.

Instructors frequently prepare electronic course materials at home and post them online for their classes. Telecommuting and the availability of online course materials further reduces the College's paper usage and transportation impacts.

Personnel in the College's distance learning office help instructors develop and design remote learning courses. The office provides weekly drop-in sessions as well as short workshops on e-learning and best practices in course design.

The Distance Learning office assists instructors to keep students engaged by assisting them to adopt e-classroom techniques that appeal to visual learners who are peer oriented: discussion boards with threaded discussions, videos, conferencing, interactive simulations, music, assignment rubrics, interactive web authoring and the ability to interact with instructors.

The College offers two hybrid courses as distance learning options[5]: Orientation to Energy Resource Technology (3 credits) and Energy Resource Technology (3 credits).

Extended Learning. The College is required by law to provide adult compensatory education to its community, and manages 14 such programs, distributed about evenly between skills development programs and programs in which students may earn both high school and College credits. These programs contribute to the College's sustainability efforts by assisting people to gain skills to become employable and thereby, to sustain their families. Enhanced with increased knowledge and with living wages, these individuals go on to practice sustainability in their families by managing budgets, conserving water, gas, electricity, food and fuel and teaching conservation to their children. At work, they practice sourcing and purchasing products that safeguard human health and safety, look for ways to make production more efficient and less wasteful, and recycle, pre-cycle and reuse resources.

Skills development programs include:

- Adult Basic Education
- General Education Development (GED). These courses are taught in English and Spanish and lead to the GED certificate.
- Young Parents Opportunity Program, also leading to an adult high school diploma or GED.
- The Gateway to College Program supports high-risk youth to earn a high school diploma. This program is also a dual-credit program.
- English as a Second Language Programs
- Program of Intensive English for international students.
- Credit developmental classes enhance students' basic skills in reading, writing and study skills.

Dual-credit programs include:

- Advanced College Credit. This program allows high school students to take courses that are certified to have college-level outcomes so that they may earn both high school and college credits simultaneously.

[5] "Hybrid," meaning multiple delivery methods and media, e.g. field trips, online study, lecture, movies and events, etc.

- High School Partnerships. In this program, students take college-level courses taught by College instructors at high school campuses.
- Extended Option Program. This program is tailored for high school students who have completed their matriculation requirements but have not yet graduated and wish to pursue supplemental education.
- The Smart Internships Program provides cooperative work experiences for high school students.
- The Bridges Program supports students who have already earned a high school diploma from their local high schools, but who need additional transitional support to further training, education or workforce skills.
- Clackamas Middle College (in partnership with the North Clackamas School District). This charter school program provides an alternative pathway to the high school diploma, allowing students greater freedom to organize their curriculum, and preparing students for College admission. Clackamas Community College instructors go to the high school, and/or students come to the College for classes.)

Education, Early Childhood Education & Human Services. Aspiring teachers may complete lower division coursework at Clackamas Community College, and then transfer for their upper division work. Students who want to become directors of public or private day care and home care programs may earn certificates or AAS degrees in Early Childhood Education at the College. Students working with families at risk may pursue a certificate in family development.

In all of these fields of study, learning modules are taught in environmental health & safety, and sustainable choices in the selection and purchase of materials. Acquiring baseline education and skills empowers people to understand and participate in a variety of society's sustainable efforts. For example, people who are able to buy a house are likely to take an interest in weatherization and energy efficiency because these things affect their budget. People who are educated are less likely to be exploited in the labor market and more likely to be invested in their communities. By extension, social justice is served by education, and sustainable communities grow from this balance. In other words,

> *"Everyone does better when everyone does better."*
> - Anon.

Continuing Education of Campus Services Staff. Staff who monitor and maintain the College's HVAC technology are trained in the new technologies and their digital control systems, and they continue to attend specialized vendor-sponsored training sessions, pursue additional licenses and certificates and to attend professional development courses.

Articulation with High Schools, Colleges & Universities. Clackamas Community College works to enhance and sustain career pathway continuity in the following ways:

- improve high school student access to professional technical opportunities and career pathways at the College, particularly in the field of renewable energy[6];

[6] The college has developed a Sustainability Pathway in its High School Pathways to Postsecondary project.

- has developed a Sustainability Career Pathway for CCC students;
- sustains relationships with all high schools in the county and has active recruiting programs and events;
- develops and updates articulation agreements between Gladstone High School, the College and Oregon Institute of Technology;
- provides the first year of instruction for students wishing to transfer to Columbia Gorge Community College's Wind Technology Program;
- works to provide clearer transfer pathways for students wishing to enter Oregon State University, the University of Oregon and Oregon Institute of Technology.

III. Energy Efficiency & Renewable Energy

Oregon City Campus – Existing Conditions

Energy Use. In 2005, the engineering team in Campus Services took actions to improve energy efficiency at its three campuses. In that year, the Oregon City campus consumed nearly a half-million dollars in energy. The team undertook technical, economic and financial analysis of lighting, heating, cooling and ventilation equipment, studied energy consumption and emissions and investigated the performance of its pneumatic, hydronic, electrical and electronic control equipment.

The engineering team then ran models to calculate potential savings, reduced emissions and improved comfort if various parts of the lighting, ventilation, heating and cooling systems were replaced, expanded, remodeled, decommissioned, or control sequences modified. A new control system, or direct digital controller, was put in place. It monitors building energy consumption, is programmable, can respond to building conditions and can be remotely observed. The result was a savings of 402,471 kilowatt hours for fiscal year 2005-2006. At the end of fiscal year 2008-2009, the College had avoided consuming a total of 1,783,638 Kilowatt hours, and had accrued a minimum savings (accounting for pricing schedule variations related to peak and off-peak usage) of $214,037. In fiscal year 2009-2010 the targeted savings is $150,000 in unspent utility budget. The three-campus system is presently maintained by three people.

In the summer of ’09, the Oregon Stimulus Program funded more than $1 million to construct and install smart and green HVAC technology controls and components. Some of the new equipment includes atmospheric dampers, ventilation economizers, improved hydronic systems and building automated room scheduling controls. In most buildings, room sensors send data to a local area network, and automated logic controllers make adjustments according to programmed set points, and, in some cases, in response to room occupancy. These infrastructure upgrades will further reduce the College’s energy use and carbon footprint. The engineering team can provide reports on projected energy savings as needed.

*Lighting***.** The College has been retrofitting lighting on its main and satellite campuses for about 15 years, starting with the installation of T-8 florescent lamps, a lower-mercury, longer-lasting lamp than the incandescent and T-12 fluorescent lamps in previous usage. In the past few rounds of construction, even lower-mercury, higher-efficiency T-5 florescent lamps have been installed. With a life of five years, the lamps have reduced maintenance frequency. In facilities such as the gymnasium and theatre, which have many lamps in their overhead lighting systems, this change has resulted in significant energy conservation and improved lighting quality.

During the design/selection process for new site lighting, fixtures were selected with dark skies guidelines. Outdoor pole lights on campus are hooded to limit light pollution of night skies. The lights go out between 11:15 p.m. and dawn.

Recently constructed buildings have included motion-detection sensors to control lighting.

Heating & Cooling. Campus Services is phasing out the use of R12 refrigerant, a chlorinated fluorocarbon, in cooling systems. R22 refrigerant, a hydrochlorinated fluorocarbon, is being minimized or phased out where possible. The chlorofluorocarbons are a family of volatile derivatives of methane and ethane harmful to the ozone layer in the earth's middle atmosphere. This layer absorbs 93 percent to 99 percent of the sun's high frequency ultraviolet light, which is potentially damaging to life on Earth. Where practicable, these refrigerants are being replaced with R410A, which is not as harmful to the ozone layer, but is still a greenhouse gas and must be controlled and contained much the same way as the older phased out gases such as R-12. The old refrigerants are carefully collected and recycled or reclaimed by a certified handler. Campus Services staff handing these products hold the required license to safely handle refrigerants.

Water Pipe Insulation. The College has insulated all above-ground and in-building pipes that convey domestic water supply, chilled water supply, water to the boiler and condensate from the boiler to reduce uncontrolled energy losses in these systems.

Solar Panels produce hot water for sinks and showers in Randall (the Gymnasium), the Pauling Center C and the McLoughlin building.

Natural Gas powers two low-pressure steam boilers in the Oregon City campus's Central Plant. Additional boilers are located in Gregory Forum, the Dye Learning Center and Street Hall. Many of the buildings are supplied with heat and hot water by means of heat exchangers in the distribution system.

In 2004, Campus Services' engineering team undertook modeling and redesigned the boiler controls. The system can now be remotely monitored, activated and shut down in response to outside temperatures and individual building requests. Savings from these optimization actions in the 21 months between September '04 and June '06 were 93,559 therms, at a value of $94,825.

Short-Term Energy Efficiency Goals - Oregon City Campus

Be More Self-Sustaining with Renewable Energy. In a bold move to be more self-sustaining with renewable energy within five years, the College intends to fully develop an alternative energy infrastructure at the Oregon City campus, utilizing renewable resources that may include solar, wind and geothermal resources and co-generation capabilities. Concurrently, the College will develop additional courses to add to its existing programs in Renewable Energy Technology and Renewable Energy Management. In addition, fundamental learning in renewable energy, climate stabilization and sustainability will be infused into curricula in business, math and science.

The renewable energy capacities at the Oregon City campus need to be assessed, and efficiencies, paybacks, credits and synergies of various scenarios evaluated. The Campus Services Division of Clackamas Community College is coordinating this effort and hopes to have Phase I engineering plans, financial instruments and energy grid partners finalized by summer quarter of the 2009-2010 academic year.

*First Step: Renewable Energy Demonstration Projects***.** A team in the Renewable Energy program is embarking on renewable energy demonstration projects that will contribute to the campus's alternative energy infrastructure system. The projects will use local wind, solar and geothermal energy to reduce dependence on the central energy grid and increase efficiencies of existing system. There is great interest in the education and training opportunities inherent in these demonstrations.

Assess Energy Efficiency of Buildings & HVAC Systems. In 2010, Campus Services will be contracting for additional energy efficiency assessments of Oregon City campus buildings and utilities. The findings of this analysis will guide the exploration of on-campus renewable energy sources that could be developed to reduce energy purchases.

Develop Projects to Showcase Ancillary, Local, Renewable Energy. Augment the efficiencies of the College's existing systems by bringing three sources of renewable energy online.

- In a second demonstration project, outdoor lighting energy needs would be supplied by a hybrid system of hooded, solar/wind-powered lights.
- A consulting company will be investigating options to further optimize the heat and hot-water system by: 1) converting to condensing boilers, and/or 2) adding steam turbines to steam conveyance pipes for the purpose of co-generating power; 3) Installation of additional solar thermal systems.

Ground Source Cooling. In fall of 2009, Campus Services used Go Oregon funds (federal Stimulus money) to begin installation of a ground-source cooling project at the Lewelling building that uses the principles of heat transfer between water in the system and the ground. This project is expected to cut building heating and cooling costs up to 50 percent. Reductions in heating and cooling costs will be monitored.

Install Higher-Efficiency Lamps in Selected Locations.

- Replace metal halide lighting in the library with LED or newer technology lamps to reduce heat emissions and increase energy efficiency in this building where lights are on all day and into the evening.
- Investigate options to convert breezeway soffit lights to LED or newer technology lamps.
- Install additional occupancy sensors in selected locations.
- Install pilot site lighting project to test hybrid- (solar/wind) powered outdoor lights.

Investigate Co-Generation in Central Plant. Investigate the potential for steam-powered generators in Central Plant's low-pressure boilers.

Wilsonville Training Center

In 2001, the College constructed an environmentally friendly 35,000 square-foot addition to an existing 12,000 square-foot structure built in 1992 in Wilsonville, Oregon. Basic materials were used, including concrete floors. An open commons area sets the tone for community and

collaboration, and large ground floor and clerestory windows bring daylight into the common space. The double-height commons area can accommodate up to 250 people, and the building is designed to be flexible, allowing standard classroom modules, a variety of seating arrangements and three sizes of classrooms.

This campus is home to the Utility Training Alliance, a Clackamas Community College partnership with PGE and PacifiCorps. The partnership offers opportunities for occupational training and career advancement to employees of the two utilities. The utility companies provide management training in portions of the building, and the College provides training for utility workforce engaged in transmission corridor maintenance. In addition to utility workforce training here, students in the Energy Resource Management certificate and degree programs attend classes at the center. Students may also pursue the six-month Utility Workforce Readiness Pathway certificate which leads into the Energy Resource Management certificate and degree program.

Instructors from the Occupational Safety and Health Association (OSHA) teach free classes at the center. Academic advising, enrollment and testing services are offered at the center and students may pursue general education courses taught evenings and weekends. A dining area, a commons and a bookstore are available, and the center may be rented by community groups for special events & parties.

Funds from the Workforce Investment Council of Oregon and the Workforce Investment Act are provided directly to this center to manage workforce training at the county level. The College assembles resources to deliver training.

Harmony Community Campus

Community Collaboration Creates Community Campus. To inspire and help guide the future of a 100-acre site at Harmony Road, Sunnybrook Road and 82nd Avenue, an unprecedented alliance of partners met to work toward developing a unified vision for the area. Together with citizens and business leaders, this partnership of Clackamas Community College, the Oregon Institute of Technology, North Clackamas School District, North Clackamas Chamber of Commerce and Clackamas County's departments of Transportation and Development, Business and Community Services and Water Environment Services developed the following vision, purpose and mission, guiding principles and name – the Harmony Community Campus – as a framework to help guide future activities on the site:

VISION: The Harmony Community Campus is a model for sustaining the vitality of the economy, environment and community in Clackamas County and the region.

PURPOSE: To increase opportunities for community members to learn, enhance health and fitness, observe and enjoy nature and gather together.

MISSION: The Harmony Community Campus will be a model for a healthy economy, incorporating a variety of educational opportunities, alternative energy uses and green

development practices. It will provide resource protection, conservation and alternative transportation, and will enhance natural habitats and the ecology of the area. People will be encouraged to use public transportation, bicycles, walk or carpool to access the area.

GUIDING PRINCIPLES:

What we do:	How we Do it:
Provide lifelong learning	Ensure transportation choice & accessibility
Demonstrate sustainability	Utilize smart growth principles
Ensure environmental stewardship	Demonstrate shared leadership & responsibility
Support economic development	Model collaboration, cooperation & civic engagement
Promote healthy living	

PARTNERS AT HARMONY COMMUNITY CAMPUS:

- The Oregon Institute of Technology is redeveloping to accommodate the expanding university and renewable energy program.
- Clackamas County Transporation & Development is helping citizens and businesses create vibrant, sustainable communities.
- North Clackams Aquatic Park is providing community based social and recreational experiences.
- Clackamas County Water Environment Services is managing and improving watershed and community health.
- North Clackamas Parks & Recreation District is providing recreational experiences and environments for all ages and needs.
- North Clackamas Chamber of Commerce is committed to a vibrant business environment.
- North Clackamas School District strives to attain excellence in education.
- Clackamas Community College is meeting growing educational, workforce & training needs.

Collaboration with the Medical Community. During conversations of a blue ribbon committee comprised of health care providers, it became clear that there was a need to provide education and technical training for the workforce required by the vibrant medical industry in the area. Pre-design charettes were held with the building's neighbors, future occupants and its designers - the architect, engineer, landscape architects, mechanical and lighting systems engineers and others. A vision for a healthy, sustainable building grew, and was realized in the construction of a 45,600 square-foot building that serves not only dental and medical training needs but general education as well. The center includes a bookstore and has been in operation since 2008.

Today, the new Harmony education building provides a home for the College's thriving health sciences programs, as well as meeting community needs with a large program in English as a Second Language, community education classes, basic skills and general education, and student services. The Clackamas Small Business Development Center is housed in the adjacent Oregon Institute of Technology's satellite campus facility.

A Sustainable Building is Conceived & Constructed. A design objective for the new building was to make it 15 percent to 20 percent more energy efficient than required by Oregon's building code. Sustainable elements of the building include:

SUSTAINABLE DESIGN ELEMENTS:

- Passive solar exposure for light and heat reduce energy use and make the building interior a very pleasant place to be.
- High performance windows minimize heat gain and maximize light transmission.
- Translucent window shades are light colored on the exterior to reflect heat and dark on the inside to reduce glare on computer monitors.
- Daylight sensors within the laboratories automatically adjust lighting levels.
- Stormwater from the roof is routed into retention / flow-through planters built against the building. Inside, a commons area is enlivened by the colors and textures of the native shrubs, rushes and grasses in the planter.
- Exterior sun screens prevent low-angle direct sunlight in winter from entering the rooms and causing glare.
- Re-lights, or interior windows allow interior spaces to be lit by daylight that penetrates into the building's center.
- The building is tobacco and smoke free.
- Light colored roofing reflects heat, reducing cooling costs.
- Low-maintenance, durable materials are utilized for the building exterior.
- Polished concrete floors are durable and require little care.
- Radiant heat is supplied to the lobby by heated water in plastic coils within the floors.
- Many of the products used in construction are made from partially recycled materials.
- Interior finishings, furnishings and paints were selected fo no- or low-volatile organic compounds, in keeping with the building's primary use as a community center and a medical training facility.
- The building complies with ASHRAE 62.1 (standard for indoor air quality) and ASHRAE 55 (standard for thermal comfort conditions for human occupancy).
- There is carbon dioxide monitoring in all high occupancy locations.
- There is no use of ozone damaging chloro flourocarbon-based refrigerants for cooling systems.
- Restrooms have low-flow fixtures and sensor-operated faucets.
- Ceiling tiles have a high light reflectance (90 percent), which helps to minimize the amount of artificial light needed.
- Mechanical and electrical rooms are located in a secured, spacious central workspace that can be expanded to serve new buildings in the future. The systems are operated with direct digital controls

SUSTAINABLE MATERIALS:

- Light gage steel products contain 50 percent or higher recycled materials.
- The majority of the insulation is formaldehyde-free and contains a minimum 25 percent recycled content (at least 20 percent post-consumer).
- Gypsum board on exterior walls has a scrim of fiberglass, which provides no surface for mold to grow on.

- Linoleum bulletin boards are made from renewable raw materials.
- Carpets meet the testing & product requirements of the Carpet & Rug Institutes Green label Plus program.
- Ceiling tiles have 72.7 percent recycled content and have an anti-microbial coating and humidity resistant properties to protect against mold and mildew growth. The tiles have no added volatile organic compound (VOC) formaldehyde.
- Composite wood and agrifiber products contain no added urea-formaldehyde resins and are produced in Oregon.
- Architectural paints, coatings and primers applied to interior walls and ceilings do not exceed the VOC content limits established in Green Seal standard GS-11. No VOC paint products are used on interior spaces.
- Concrete mix contains 10 percent to 15 percent fly ash (a by product).
- Light fixtures were selected to reduce light pollution.
- Ten types of construction waste were collected & recycled.
- Solid surface counters in rest rooms are made from recycled materials.
- White boards and rubber flooring are GreenGuard Indoor Air Quality certified.

CLASSROOMS. The classrooms have high-tech podiums with computer ports, document readers, InFocus projection capabilities, and, in some locations, video conferencing capabilities. Modular furniture in the classrooms lends itself to various configurations to meet students' and instructors' needs. Recycling containers are located at the student mailbox area and in other central locations. The building has no vending machines. Staff decided instead to offer a coffee cart to building users, stocked with locally purchased and made items.

CONTROLS. Building HVAC systems can be monitored and controlled remotely.

IV: Opportunities to Achieve Greater Sustainability

Introduction

It is clear that the College has already gone a long mile to integrate principles and practices of sustainability into every aspect of college life, education and facilities planning, operations and maintenance. A host of campus champions has initiated projects, processes and initiatives to drive these changes. Members of the Sustainability Committee have brought forth many additional ideas to more deeply infuse sustainability into campus life and practices.

This last section, the *Opportunities* section of *Sustainability Assessment for Clackamas Community College* is a collection of ideas to be considered as the *Sustainability Plan* is developed. These ideas are derived from several sources:

- ideas of people interviewed for this *Sustainability Assessment*
- observation of campus conditions
- sustainability principles
- model sustainability program elements of other colleges
- organizational development and project management principles

Framework for the Sustainability Plan. The sustainability accomplishments enumerated in this *Assessment* will be summarized in bullet points, by category, in the forthcoming *Sustainability Plan*, so that the entire completed plan will be a living document that can be updated as projects are completed and new ones developed. The framework of the completed *Sustainability Plan* will follow the rough outline below (please note that the basic elements of the plan [in bold] are listed alphabetically, not in order of priority).

Buildings
Specifications for sustainable education buildings
Water use, conservation, metering & sub-metering
Day-lighting
Passive heating (including use of waste heat), passive cooling, & ventilation
Roof materials
Windows & entry way designs
Materials (locally sourced, recycled/recyclable)
Universal access
Indoor Air Quality
- Furnishings
- Finishes
- Cleaning materials
- Process materials
- Office machines & materials
- Ventilation

- Pesticides
- Outdoor activities near air intakes

Climate Protection
Greenhouse gas inventory
Placeholder
Placeholder
Placeholder
Placeholder
. . .

Communication & Events
Events (e.g. "Green Fridays," "Energy Challenge," "Bike to School," or "Paperless Day.")
Speakers & films
Competitions, awards & recognition
Sustainability & FYI news
Recycling information & annual report
Sustainability website
Outreach on behavior change (e.g. recycling changes)
Outreach to the larger community on best practices
Inspire college-wide collaboration
Create sustainability piece of "on-boarding"
Green suggestion box, bulletin boards

Curriculum & Education
Academic, career, technical & professional education, basic & continuing education
Special & capstone projects, service learning
Work-study & Cooperative Work Experience
Student club & activities
Demonstration energy efficiency & renewable energy projects

Custodial, Maintenance & Operations
Green cleaning supplies
Re-use, recycling, pre-cycling
Materials (see Buildings)
Purchasing, warehousing
Mold management
Integrated pest management

Energy
Continual program of audits, efficiency upgrades & retrofits
Commissioning, re-commissioning & controls
Sub-metering
Renewable energy – solar, wind, geothermal
Co-generation of energy

IT efficiencies for offices, labs & central locations
Energy efficient lighting
Room scheduling, occupancy sensors
Phantom loads, plug loads
Energy Star appliances
Distributed energy partnerships
Apply savings to fund sustainability program

Food Service (also see Purchasing)
Pre-cycling
Serving ware
Food waste
Recycling & composting
Water use
Students engagement & involvement
Locally produced foods, kitchen garden

Landscape & Grounds Keeping
Invasive species management
Threatened & endangered species management
Composting & chipping
Stormwater
Irrigation, sensors & metering
Pesticides
Integrated pest management
Natural area planning

Purchasing
Sustainability policies & guidelines
Contracts & specifications
Food service contract
- Pre-cycling
- Serving ware
- Food waste
- Recycling & composting
- Water use

Vending machines

Stormwater
ID short & long-term strategies & projects to reduce pollution, desynchronize stm/w runoff, increase infiltration, achieve net-zero runoff from new projects

Transportation
Commute alternatives, options & incentives
Bike & pedestrian safety & connectivity
Idling on campus

Priority parking
Distance learning & telecommuting
Transportation partnerships with outside agencies & interest groups
Timeline & strategy to obtain low-impact campus fleet
Lime airline travel
Promote teleconferencing & telecommuting

Waste & Recycling
Paper
Food
Metal
Plastic
Medical, hazardous & universal wastes
Garbage
Outreach

Proposed Actions & Ideas

The ideas listed below and the plan and projects developed from them will change over time as the campus community continues to incorporate sustainability into curricula, operations, education, campus life and services to students.

I. Buildings

- Develop specifications for sustainable education buildings
  - Water use, conservation, metering & sub-metering
  - Day-lighting
  - Passive heating (including use of waste heat), passive cooling, & ventilation
  - Energy efficiency
  - Roof materials
  - Windows & entry way designs
  - Materials (locally sourced, recycled/recyclable)
  - Universal access
  - Indoor Environmental Quality (air quality, light, temperature, acoustic space)
    - Furnishings
    - Finishes
    - Cleaning materials
    - Process materials
    - Office machines & materials
    - Ventilation
    - Pesticides
    - Outdoor activities near air intakes
    - Light & glare
    - Noise

- Thermal comfort

II. Climate Protection

- Collaborate to evaluate and select/develop methods for assessing campus GHG.
- Consider how selected instructors and student groups can contribute to GHG assessment efforts.
- Consider how learning modules for selected courses can be developed from GHG assessment and goal-setting activities.
- Prioritize actions and coordinate with Sustainability Committee throughout goal-setting and development of action plans.

INVENTORY GREENHOUSE GASSES

- Collect Raw Baseline Data in the following categories:
  - Purchased Electricity
  - Purchased Steam/Chilled Water
  - On-Campus Stationary Sources (energy generation)
  - Transportation (commuting, air travel, campus fleet)
  - Agriculture (fertilizer use, animal waste)
  - Solid Waste (incinerated, landfill)
  - Refrigerants and other Chemicals
  - Offsets (Renewable Energy Credits purchased, composting, forest preservation etc)
- Keep journal records of all contacts.
- Record information sought and contact responses.
- Formulate contact list to streamline future data collection.

CALCULATE EMISSIONS using international standards for emission coefficients to determine campus GHG emissions totals.

ANALYZE AND SUMMARIZE RESULTS

- Develop baselines that will allow CCC a quantifiable way to measure progress while moving forward.
- Formulate recommendations for a climate action plan.
- Present findings to Sustainability Committee and brainstorm solutions.

SUPPORT THE INTEGRATION OF SUSTAINABILITY INTO THE CURRICULUM to improve climate and sustainability literacy on campus and at home.

III. Communication & Events

- Events (e.g. “Green Fridays,” “Energy Challenge,” “Bike to School,” or “Paperless Day.”)
- Speakers & films
- Competitions, awards & recognition
- Sustainability in weekly FYI news

- Create a stand-alone sustainability tab in the College's web pages that includes mission, academic offerings, student life, past accomplishments and current projects concerning achievement of campus sustainability. Also include best practices, interesting & useful information for daily life.
- Outreach on behavior change (e.g. recycling changes)
- Train instructors & staff to manage & recycle commonly used small batteries for hand-held & larger portable devices and appliances, as well as 9-volt batteries
- Outreach to the larger community on best practices
- Inspire college-wide collaboration
- Create sustainability piece for "on-boarding" new employees
- Green suggestion box, bulletin boards
- Buzz about energy efficiency accomplishments . . . projects/savings past, present, future.
- Weekly announcement in FYI or other campus-wide media, containing a sustainability tip, buzz, news bit, activity or call to action.
- Continue announcing Green Screen, Speakers' Bureau other sustainability events.
- Continue providing outreach to the community about environmental and sustainability education opportunities at the College.
- Annually, issue updated information about campus recycling systems, and, especially, recognize the campus community for their efforts to reduce waste and increase recycling. How many tons of paper each year? Of metal, glass, etc. How many computers, fluorescent lamps, batteries, etc. were recycled last year? How many barrels of oil were recycled from the automotive labs? Celebrate accomplishments.
- Periodic updated information about
  - Washing vehicles only in wash rack in Automotive.
  - Basic information about the stormwater system, its vulnerability to pollution, and the natural areas to which College stormwater discharges.
  - Availability of community garden plots through student outreach.
  - Collaborate with English Department to develop illustrated one-page fact sheets that focus on different aspects of sustainability, concluding with a call to action.
- Develop and implement a campus-wide forum to report on student/admin./committee sustainability projects and goals. The forum might have performances, concurrent sessions, goal-setting, events

IV. Curriculum & Education

ACCREDITATION/CORE COMPETENCIES

- Add sustainability to the seven (?) core competencies or educational outcomes to which instructors at CCC teach.

PROFESSIONAL DEVELOPMENT

- Establish & maintain funding to support professional development activities concerning sustainability.
- Improve the training interface with Workforce Development.

STUDENT RESEARCH

- Determine ways to involve students in meaningful research projects connected with sustainability questions (e.g. how much water would be saved by eliminating cafeteria trays? Best solar incidence for solar hot water system on a selected building? How does an energy-producing algae cell work and where would it be best located on campus for optimum production? What mass of biofuels would be required annually to operate a fuel cell? How to assess the geothermal heat potential of geologic substrata at the Oregon City campus? What would be the energy generation capability of exercise machines in the Weight Room of the Gymnasium?)

DATABASE CONTRIBUTIONS**.** Determine what long-term studies on campus could successive generations of students contribute data.

TRAINING IN BLACKBOARD, MOODLE & OTHER ONLINE EDUCATION SYSTEMS

- Increase teacher training in Blackboard and other online tools to reduce paper used in teaching and learning.

STUDENT ENGAGEMENT IN CAMPUS ASSESSMENT VIA INQUIRY-BASED LEARNING

- Identify and engage students in the many tasks of sustainability assessment and recommendations. E.g. Have students look at paper use, stormwater generation, paper towel use in restrooms, solar potential, etc.
- Explore developing natural resource education and stewardship programs with local high school youth.

CURRICULUM INFUSION

- Work to infuse curricula with sustainability modules. Make climate and sustainability literacy official learning outcomes for transfer degree students. Consider accomplishing this through modules in the other outcomes.

WORK-STUDY & COOPERATIVE WORK EXPERIENCE

- Develop a campus-wide list of sustainability projects in which work-study and cooperative work experience students can become engaged.

INTERDISCIPLINARY CAPSTONE CLASSES

- Develop capstone courses in technology, science and social science fields that have sustainability as a focus

DISTANCE LEARNING

- Engage diverse student communities in dialogues to determine depth and breadth of unmet needs for distance learning and flexible learning scheduling.

NEW COURSE PROPOSALS.

- Develop a proposal process that begins with *students,* to complement the existing proposal process that begins with teachers.
- Work to make the lecture series a class for credit.

- Consider offering the following courses: Sustainability Coordinator, Institutional Waste & Recycling Management; Energy Efficiency Evaluator.

ENVIRONMENTAL EDUCATION FOR EDUCATORS

- Launch this program, already developed for the college by faculty working with a National Science Foundation Grant. The program would articulate with Oregon State University's teacher education program.

STUDENT ENGAGEMENT IN ENVIRONMENTAL ACCOUNTING

- Engage students in environmental accounting to evaluate alternative solutions (e.g. compare the cost and carbon footprints of using towels or electric blowers for hand drying).

STUDENT ENGAGEMENT IN PRIORITIZING SUSTAINABILITY PROJECTS ON CAMPUS

- Collaborate with ASG/other student groups (possibly students in the Pathways to Sustainability series) to identify and carry out a sustainability project each term or academic year.

STUDENT ENGAGEMENT IN CONSTRUCTION OF RENEWABLE ENERGY TECHNOLGY CONSTRUCTION ON CAMPUS

- Engage students in designing, manufacturing, installing, retrofitting and maintaining demonstration renewable energy systems on campus.

SUSTAINABILITY LEARNING FOR AT-RISK YOUTH

- Infuse science & related learning into curricula for at-risk youth.

HYBRID COURSES

- Develop more interdisciplinary courses that integrate arts, humanities and math and science.

HORTICULTURE / GROUNDS

- Implement a demonstration terra pieta (biochar) project on campus to test the potential for sequestering carbon in campus soils.
- Start a kitchen garden for use by Food Services.

COMMUNITY OUTREACH

- Be a source of information and a resource for the community for all things sustainable and environmentally sound. Provide demonstration projects, workshops, kiosks, and activities to engage the community. Continue to utilize the College as a demonstration site.
- Develop strategies and methods to let the greater community know about environmental and sustainable education opportunities at the college.
- Provide cooking literacy and nutrition workshops on campus for various communities.
- Provide information on cooking without meat.
- Provide information about cooking with garden vegetables.
- Continue to support the community gardens on the Oregon City campus

FAMILY RESOURCE CENTER

- Identify and adopt sustainable practices such as cooking with nutritious, local, basic foods in season, composting, gardening, recycling, reusing materials and sharing tools that routinely will be done with children.

TEEN PARENT PROGRAM
- Identify life skills that contribute to sustainable lifestyles and communities that will be taught and practiced here.

STUDENTS AND SUSTAINABILITY
- Develop and implement an outreach strategy to consistently engage students in dialogue and decision-making about climate change and carbon footprint.
- Engage students in outreach to student & campus community about new food service. conservation practices, waste stream reduction and campus recycling systems, room controls
- Support ASG group to identify and carry out a sustainability project each term or year.

CAREER DEVELOPMENT
- Generate more contacts for sustainability internships, work study projects, mentoring, job shares and shadows, summer work, experiential (cooperative work experience) credit.

HIGH SCHOOL STUDENTS
- Develop sustainability focused partnerships with district high schools.

V. Custodial, Maintenance & Operations

COMMUNICATION**.** Regularly provide information to Public Information Office regarding
- Changes in recycling system that need to be articulated to campus communities.
- Campus stormwater system, its vulnerability to pollution and ultimate discharge to streams.
- Upgrades in campus energy system that are reducing consumption.
- Demonstration projects using renewable energy.

BUILDINGS & ENERGY / CONSERVATION & RENEWABLE ENERGY
- Develop & maintain funding to implement renewable energy projects.
- Continue program of energy efficiency evaluation, upgrade, retrofit.
- Implement pilot project to install and evaluate high-speed hand dryers.
- Develop alternative sources of energy.
- Develop flexible, sustainable construction standards for new buildings.
- Regularly communicate funding needs to implement renewable energy projects.
- Continue to phase out individual copy machines on campus.
- Reduce plug loads.
- Replace outdated appliances with Energy Star.
- Evaluate energy-savings in IT operations and hardware.
- Evaluate energy savings of implementing building schedules.
- Evaluate/design/construct charging stations for electric vehicles on campus.
- Evaluate de-lamping in over-lit areas.

FACILITY MAINTENANCE
- Develop guidelines for purchasing, handling, storing and working with treated wood.
- Develop guidelines for maintaining campus stormwater swales and ponds.
- Coordinate with ODOT, Oregon City & Clackamas County and other agencies concerning stormwater and watershed management.
- Develop annual PM schedule for cleaning vaults in Automotive wash rack and document this.
- Look for opportunities to replace wooden outdoor structures such as picnic tables and boardwalks, especially near water, with plastic lumber that can be recycled. Alternatively, small outdoor structures can be constructed of cast concrete that is formed to look like wood.

GROUNDS KEEPING & LANDSCAPE MAINTENANCE (please see section VIII, Landscape & Groundkeeping, below)

STORMWATER (Please see section XII, Stormwater, below)

PAPER USE & PRINTING
- Evaluate printing & printers to determine health implications, cost differentials & potential savings of replacing desktop & area laser printers with multifunction photocopiers..

SOLID WASTE MANAGEMENT (Please see section XIV, Waste & Recycling, below)

RECYCLING (Please see section XIV, Waste & Recycling, below)

WATER USE
- Install additional low-flow toilets, and water-on sensors for lavatory sinks
- Evaluate micro-irrigation heads for watering campus turf and planting beds
- Retrofit Oregon City campus irrigation system to accommodate irrigation controllers
- Purchase irrigation control system for remote control of irrigation systems, and provide training in the new system to groundskeepers

TRANSPORTATION
- Develop a timeline and budget for phasing in energy conserving vehicles for the College fleet
- Continue to investigate transportation from the end of the Green Line (light rail) to the Harmony and Oregon City campuses
- Continue to support carpool and alternative transportation options
- Crack seal the space between asphalt roads and concrete curbs to minimize the need to apply pesticide in curb lines that drain to stream headwater areas
- Work with county/city to designate and stripe bike lanes to the College
- Designate and stripe bike lanes on the College road system
- Improve campus pedestrian routes and safety, particularly in places distant from core areas

GREEN CUSTODIAL PRACTICES

- Continually evaluate interior pesticide management materials (mold, mice, etc.)
- Evaluate adopting Green Seal cleaning agents for all buildings

BUILDING MOISTURE CONTROL. Develop college- and building-specific written procedures for moisture controls, including:

- Building materials
- Precipitation control at entryways
- Precipitation & moisture control for envelope
- Ventilation air to control moisture
- Humidity control during unoccupied times
- Condensation control

EQUIPMENT COMMISSIONING. Refer to the college's written protocols for commissioning building equipment, including:

- Installation
- Operation
- Documentation
- O&M manuals & testing
- Ongoing monitoring
- Re-commissioning of key building mechanical systems, including:
  - Contracting w/ commissioning agent
  - Reviewing system documentation & design intent
- Include commissioning requirements in construction documents
- Prepare a commissioning plan and refer to it throughout design & construction
  - Verify installation & functional performance of systems
  - Document results & prepare a commissioning report
- Prepare an indoor air quality commissioning checklist & schedule

CONSTRUCTION ENVIRONMENTAL HEALTH & SAFETY CONTROLS

Include the following in construction planning:

- Define indoor air quality (IAQ) requirements & incorporate them into bid and construction documents
- Require the contractor to develop and use an IAQ management plan to protect the health of workers and future building occupants, to include:
  - Construction dust
  - Chemical fumes
  - Off-gassing materials
  - Moisture
  - Protection of ventilation systems
- Require the contractor to define roles & responsibilities for IAQ best management practices (BMPs) during construction
- Contractor to provide information on all proposed substitutions
  - Materials storage

  - Safe installation
  - Proper sequencing
  - Regular monitoring
  - Safe & thorough cleanup
- Contractor to conduct & document regular inspection & maintenance of IAQ measures,
- Contractor to conduct safety meetings, develop signage, identify unacceptable behaviors & establish contractor agreements that communicate the goals of the IAQ management plan
- Contractor to identify construction practices, including
- Keeping construction materials dry
- Drying water damaged materials immediately
- Cleaning spills immediately
- Sealing unnecessary openings
- Temporarily sealing ductwork
- Ventilating when needed
- During installation of any materials that will emit VOCs, providing spot ventilation for at least 72 hours after work is completed
- Requiring respirators designed to protect workers installing materials that will emit VOCs
- Reducing construction dust
  - Using wet sanding for gypsum board assemblies unless all ventilation & isolation precautions are taken
- Avoiding use of combustion equipment indoors
- Storing liquids outdoors
- Using less toxic cleaning agents
- Considering a building flush-out at end of construction, before building occupancy

BUILDING RENOVATION

Testing. Before demolition or renovation, test for lead, asbestos, mold

Timing. When possible, perform work at times when the occupants are not in the building

Distance. Keep building occupants as far from renovation activities as possible to reduce exposure to possible construction pollutants

Barriers

- Install temporary barriers (e.g., plastic sheeting) to seal the work areas from the occupied areas
- Cover all supply and return air grilles
- Exhaust air from the construction area so that pollutants cannot flow from the construction area to the occupied areas.

Containment

- Confine pollutants to as small an area as reasonably possible, for example, by wet sanding or vacuum sanding drywall to prevent the spread of dust, misting asbestos with water to prevent

it from easily becoming airborne during demolition, and keeping containers of chemicals such as solvents, adhesives, paints, and other coatings closed as much as possible
- Do not operate the heating/cooling equipment when work is causing dust to be visible in the air

Cleanup. At least daily, construction debris, dust, and scraps should be adequately cleaned up and sorted into appropriate recycling bins outdoors

VI. Energy
- Reduce the carbon footprint of the College
- Engage in a continual program of audits, efficiency upgrades & retrofits
- Continue commissioning, re-commissioning & updating controls
- Install electrical and natural gas sub-meters
- Develop renewable energy – solar, wind, geothermal
- Develop Co-generation of energy
- Evaluate continued IT efficiencies for offices, labs & central locations
- Construct energy-savings alternatives to the roll-up doors in Barlow, Automotive and other College buildings
- Continue to install energy efficient lighting
- Evaluate room scheduling, occupancy sensor.
- Reduce phantom loads, plug loads. Reduce/eliminate desktop printers, plug-in heaters
- Purchase Energy Star appliances
- Develop distributed energy partnerships
- Apply savings to fund sustainability program

VII. Food Service (also see Purchasing, section X, below)
- Evaluate additional pre-cycling
- Evaluate alternative take-out & serving ware materials & containers
- Evaluate food waste & composting
- Increase recycling in Cafeteria
- Evaluate water use
- Engage students in outreach about recycling in the Cafeteria
- Evaluate locally produced foods, kitchen garden
- Use foods in season as much as practicable
- Upgrade kitchen equipment to be more efficient

VIII. Landscape & Grounds Keeping
- Protect the integrity of remnant native landscapes on campus as much as practicable, by identifying and removing aggressive non-native plants, considering nesting and rearing seasons when scheduling mowing and pruning and maintaining natural hydroperiods.
- Review and refresh College goals for natural area planning & preservation.
- Fund redevelopment and restoration of the entire Environmental Learning Center site.

- Apply central irrigation controls to allow remote monitoring and control of irrigation systems at all campuses.
- Install rain gauges, evapotranspiration meters and irrigation controllers at campus locations.
- Install sub-meters to enable evaluation of water use by zones.
- Evaluate financial & human resources needed to achieve desired conditions.
- Evaluate substituting two-cycle backpack leaf blowers with a lesser polluting method as new designs are marketed.
- Fund equipment & labor to chip and spread woody debris generated on campus.
- Convert some turf areas to mixed grasses and herbs, native forest or shrub/forest associations.
- Insert contract language requiring mowing vendors to wash the undercarriage of mowing equipment before bringing it onto campus. This action is generally recommended in integrated pest management programs to avoid the spread of noxious weeds.
- Recycle grass clippings while mowing.
- Continue to develop partnerships with volunteer groups to help with trail maintenance and, assist with invasive plant control on campus, and to help with vegetation upkeep at the Environmental Learning Center and other similar areas on campuses
- Install drip and other low-flow irrigation technologies where needed.

IX. Leadership & Implementation

ADVISORY GROUP

- Include a representative from each instructional and operational area of campus.
- Include selected administrative decision-makers so that action steps to achieve each sustainability plan goal have support, direction, policy and funding.
- Derive priorities & major projects from sustainability plan, and means of measuring success
- Form working committees for each major project.
- Define supporting actions to achieve each goal.
- Set milestones and deliverables.
- Develop a continual process of assessing sustainability.
- Communicate with campus community through Sustainability website and College Committees page

DEANS & DIRECTORS

- Direct and support faculty to identify and provide
    - career-related learning in sustainability for students
    - career-related work in sustainability for students in Extended Learning, Early Childhood Education and Human Services
    - Devise means to offer capstone classes in which student teams from different disciplines contribute to assessment, analysis, design or revision of systems that result in greater sustainability on campus
    - Develop learning/lab/practice modules in sustainability in all courses and activity centers on campus, from the FRC to the ASG
    - ASG to identify a sustainability campaign and implement it for a year

EXECUTIVE

- Invest rigorously in energy efficiency
- Initiate and foster campaigns calling for campus community to dress for the weather, turn off lights, limit printing, reduce plug loads in offices; be vigilant about recycling . . .
- Provide direction re: transportation, space, energy, purchasing, waste & recycling
- Encourage development of departmental sustainability resource guides
- Establish & fund office of sustainability
- Continue to promote best practices and processes streamlining (reduce time and paperwork)
- Provide staff & instructor development/resources/training in sustainability
- Invest in grants office & donor opportunities
- Invest in course development and infusion of renewable energy & sustainability into curriculum
- Provide annual sustainability report to College and to board
- Champion sustainability incentives and rewards
- Seek industry partners for cost and brain-sharing

X. Purchasing

- Develop sustainable purchasing policies & guidelines, including sourcing of local goods
- Include sustainability elements in contracts & specifications (e.g. sustainable materials (locally sourced, recyclable, non-toxic . . .)
- Evaluate sustainability of and products in vending machines (healthy choices, local foods, no bottled water, BPAs or HFCs
- Establish guidelines for and source alternatives to toxic or hazardous materials
- Insert contract language requiring grounds keeping contractors to wash the undercarriages of equipment before bringing it onto campus, to control the spread of noxious plant parts.
- Eliminate the sale of bottled water on campus
- Source a copier vendor that does not charge for second page when copier is set for duplexing as a default but only one page is needed
- Investigate use of returnable take-out containers for Food Services
- Eliminate use of Styrofoam on campus
- Eliminate trays in the Cafeteria (the largest water use comes from washing them), eliminate disposable serve-ware and utensils, and minimize water use to make this service more sustainable
- Eliminate purchase of canned air; instead, encourage use of squeeze bulbs for tasks such as dusting, cleaning keyboards and preparing slides and photos for scanning; for heavier shop tasks, use compressed air
- Require vending machine contractors to install refrigerated vending machines that meet Energy Star standards, which have built-in vending miser technology
- Develop purchasing policies and outreach education regarding all types of batteries purchased by the college. Batteries may be considered as hazardous or universal wastes, depending on type. Policies should include:

- processes for prioritizing battery purchases (consider items that do not require batteries)
- consider battery types: ease in collection & recycling batteries; potential for ground- and surface water pollution if disposed in the trash; consider whether battery type must be managed as a hazardous or universal waste
- Consider the following battery types when developing policies:
    - Alkaline
    - Carbon-zinc
    - Lead-acid
    - Lithium
    - Magnesium
    - Mercury
    - Nickel-cadmium
    - Silver
    - Thermal

XII. Stormwater (Please also see Maintenance and Operations, above, for details)

- Redevelop Environmental Learning Center habitat/stormwater treatment ponds.
- ID short & long-term strategies & projects to reduce impervious surfaces and stormwater pollution, desynchronize stormwater runoff, increase infiltration, achieve net-zero runoff from new projects
- Develop once yearly PM schedule for cleaning primary stormwater CBs (those with grits collection and oil/water separation)
- Require paperwork from the CB cleaning contractor showing ultimate disposal location of the suctioned materials (review chain of custody)
- Replace selected CBs in high-use areas and campus discharge points with inclined plate oil-water separators and enhanced grit catchment.
- Create a PM schedule for clearing inlets and outfalls to stormwater swales.
- Provide stormwater swale maintenance training to grounds keeping staff.
- Purchase replacement plants for swales as needed.

XIII. Transportation & Circulation

- Promote commute alternatives, options & incentives to reduce single-occupant vehicle trips to College.
- Establish a carpool bulletin board on all campuses.
- Promote local bike tours.
- Work w/ regional partners to identify and create opportunities.
- Improve campus bike & pedestrian safety & connectivity.
- Construct sidewalks.
- Limit idling on campus.
- Evaluate priority parking.
- Promote distance learning & telecommuting.

- Evaluate transportation partnerships with outside agencies & interest groups.
- Develop timeline & strategy to obtain low-impact campus fleet.
- Limit airline travel.
- Promote teleconferencing & telecommuting.
- Crack seal road edge between asphalt and curb to avoid having to apply pesticides in the curb line that drains to Newell Creek.
- Retrofit catch basins at selected outfalls with coalescing plate oil/water separators and grit vaults.
- Coordinate with ODOT, Clackamas County, Oregon City, Metro and bicycle advocacy group to develop a plan for an expanded network of multi-use pathways to the College.
- Upgrade the walking trail on the Oregon City campus.

XIV. Waste & Recycling

WASTE

- Increase number of recycling stations.
- Increase "customer" outreach efforts and place additional collection facilities to divert more of the College's waste stream to recycling.
- Evaluate food service waste.
- Evaluate a demonstration project in food waste and paper plate/cup recycling and/or composting.
- Evaluate returning to ceramic serve ware in the Cafeteria.
- Manage leakage from the waste compactor by containment, routing it to the sanitary sewer or, at a minimum, filtering it before it flows to the storm sewer system. Change filters frequently.
- Track tonnage to landfill. Announce to College community annually to increase reduction awareness and focus.
- Install high-speed hand dryers in restrooms to eliminate paper towel waste and achieve savings in labor to maintain towel dispensers and waste.

RECYCLING

- Develop recycling communications campaign that provides regular updates on how, what and where to recycle on campus, and also reports recycling successes and benchmarks.
- Improve recycling in the Cafeteria by adding additional recycling station and with regular campus-wide communication. Look to OMSI and Lane Community College for models on recycling education *in* the Cafeteria.
- Ban the sale of bottled water on campus.
- Reduce the quantity of class schedules printed each term so that there are not so many extras.
- Make electronic schedules easier for users to jump to the sections they want to scan.
- Investigate recycling of food waste.
- Provide strong leadership to seek, facilitate and maintain consistent upgrades to the recycling system.
- Continue to evaluate plastics recovery.
- Track tonnage of recycled materials, by category.

- Track tonnage and income from metal recycling by Automotive, Campus Services, Welding, and Training Center.
- Support waste audits in the Quad every two years, accompanied by a performance-style narrator and events. Publish the results immediately and call for campus community to develop ideas.
- Fund and engage in a continual cycle of upgrades to the recycling system as the market continues to evolve

XV. Big Ideas. These can be prioritized based on best investments to reduce greenhouse gas emissions and consumption of fossil fuels.

BIOMASS RECYCLING

- Use pruning debris and soft vegetation from campus, and local agricultural wastes in a bio-fuels digester
- Convert areas of open fields to quick tree crops such as cottonwoods, to harvest for biomass energy production.
- Recycle/compost food scraps.

GROUNDSKEEPING

- Review turf area cultural practices in an effort to reduce irrigation requirements and maintain health and appearance.

STORMWATER

- Remove unneeded outdoor permeable surfaces and replace with (native) vegetation.
- Install sub-surface stormwater treatment/retention systems under surface parking lots.
- Restore and reconnect headwater wetlands to Newell Creek, routing stormwater to these wetlands.
- Store and use rainwater for irrigation.

TRANSPORTATION

- To cut down on the need for people to commute to the College by car, consider taking technical, professional development and academic learning courses to facilities such as vacant stores or existing community buildings within neighborhoods.
- Install charging stations on campus.
- Support Casey Sim's *Big Idea* – a light vehicle powered by compressed air
- Convert surface parking to structured parking.

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