VII. STANDING COMMITTEES

A. Academic and Student Affairs Committee

Climate Action Plan

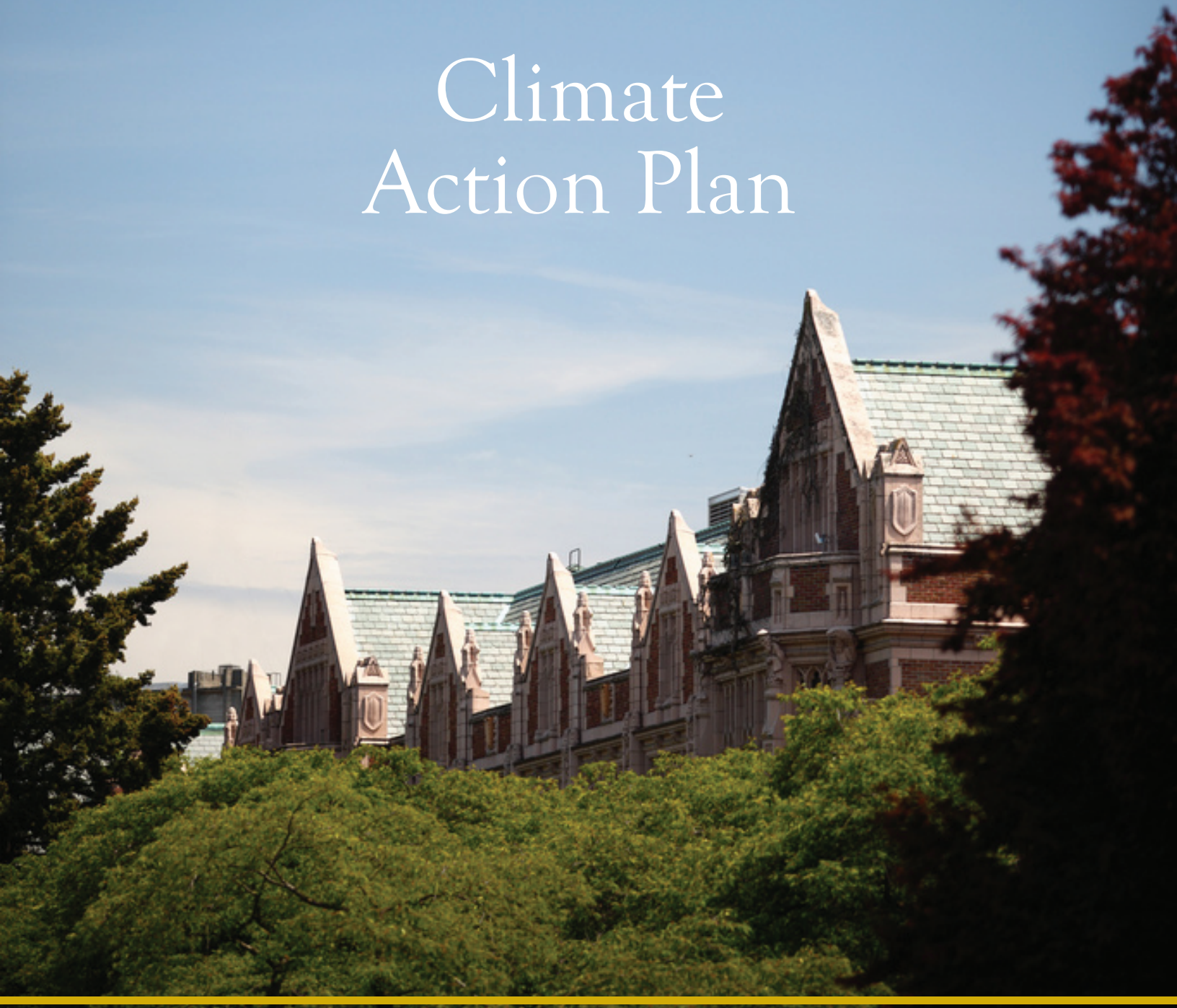
For information only.

Attachment

University of Washington Climate Action Plan, September 2009

UNIVERSITY of WASHINGTON

Climate Action Plan



September 2009

UNIVERSITY OF WASHINGTON

OFFICE OF THE PRESIDENT

Mark A. Emmert, President

September 3, 2009

American College & University Presidents'
Climate Commitment Signatories

Dear Colleagues:

The University of Washington's (UW's) Climate Action Plan is a compilation of ideas and strategies from across our three campuses in Seattle, Bothell, and Tacoma. It is, in essence, a plan to plan. Our report describes what we hope to do in the next 20 years and beyond to control the UW's input to the atmosphere and, at the same time, to inform and prepare succeeding generations of citizens to make personal and community changes that reduce our carbon footprint. Accordingly, we are very pleased to submit our plan as a response to the climate challenge set by the ACUPCC.

Our plan is the product of the collaboration of more than 100 students, faculty, and administrators who engaged in work teams under the oversight of our Environmental Stewardship and Sustainability Advisory Board. These dedicated community members unleashed their imaginations, observations, and understandings to help the UW's leadership to chart a path forward. The possibilities for action described in the report are both inspiring and challenging. We have much work to do to explore strategies, assess their potential and priority, and create an implementation plan.

Here at the UW, we have a huge advantage in the broad community interest, creativity, and talents found across each of our campuses and affiliates. This makes our plan an excellent and collaborative opportunity to achieve our climate goals while enhancing our academic mission.

We are excited about the future ahead, even within this challenging economic time. Working across our University of Washington community to achieve climate neutrality is a challenging and rewarding effort and will transform us.

Sincerely yours,

Mark A. Emmert
President

301 Gerberding Hall • Box 351230 • Seattle, Washington 98195-1230 • 206-543-5010 • FAX: 206-616-1784

UNIVERSITY of WASHINGTON | TACOMA

OFFICE OF THE CHANCELLOR

To: American College and University Presidents Climate Commitment Colleagues

As a campus of the University of Washington, the UW Tacoma has worked collaboratively with the Seattle and Bothell campuses to develop the attached Climate Action Plan (CAP). As noted by President Emmert, this plan to plan provides an important roadmap for the Tacoma campus as we strive to achieve our climate goals while meeting the higher educational needs of the South Puget Sound region.

The University of Washington Tacoma is excited to take a leadership role in supporting sustainability and environmental stewardship in the region we serve. Our campus recognizes that we are uniquely positioned as a growing campus to be at the forefront of innovative projects that can demonstrate our commitment to the goals of climate neutrality.

UW Tacoma recently completed an update to the campus master plan and adopted in its guiding principles the conservation of the environment by promoting stewardship and becoming a model and learning laboratory of sustainability. In conjunction with the master plan, an infrastructure master plan was developed with a focus on identifying sustainable strategies for energy, carbon and water. The master plan integrates many of these strategies such as filtering stormwater with rain gardens and developing sustainability guidelines for buildings.

As each campus of the UW develops its implementation plan, the Tacoma campus will track and report its accomplishments individually on the ACUPCC site.

We are privileged to submit this plan in response to the climate challenge set by the ACUPCC and look forward to working with our university and community partners to help make our world a better place.

Patricia Spakes

Patricia Spakes
Chancellor
University of Washington Tacoma

UNIVERSITY of WASHINGTON | BOTHELL

September 2, 2009

Dear American College and University Presidents' Climate Commitment Colleagues,

The *University of Washington Climate Action Plan* (Plan) signed by the President of the University of Washington and the Chancellors of UW Bothell and UW Tacoma is a first step toward setting and achieving greenhouse gas emissions reduction targets and setting strategies for academic engagement in climate change as required by the American College and University Presidents' Climate Commitment. The Plan outlines the strategies to be undertaken and explored by the UW with the intention to become climate-neutral. UW Bothell staff and faculty participated in the development of this plan through all the academic and administrative sub-teams and are enthusiastic endorsers of this Plan.

As a campus, we continue to contribute to environmental research, education and community outreach. Sustainability is one of seven priorities of UW Bothell's 21st Century Campus Initiative and resonates with the aspirations of the UW Bothell community. In 2009, the campus Sustainability Plan emerged as a signature initiative outlining the environmental and human sustainability strategies to be embraced and carried forward.

UW Bothell has a number of successes that are incorporated into the Plan. We see a constant increase in programs to reduce commuting emissions. Our approach to curriculum development infuses sustainability principles and practices across our curriculum to help us generate the kind of new programs and courses that will make us distinctive. Our year-long "Growing Sustainability" project has involved faculty and staff and received funding from the Washington Center and the Russell Family Foundation. Our campus has relatively new construction and features modern infrastructure making our campus a candidate for an electronic dashboard system to baseline energy and water use to identify energy conservation opportunities.

We have a strong commitment to reducing greenhouse gas emissions and striving to become climate-neutral. Our efforts will be in concert with our faculty, staff, students, the UW and community at large. We look forward to continuing these efforts and achieving greater success.

Sincerely,

Kenyon S. Chan

Kenyon S. Chan
Chancellor
University of Washington Bothell

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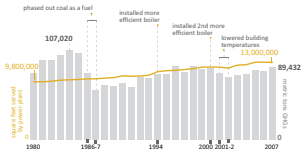
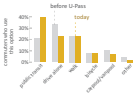
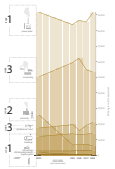
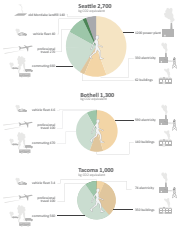
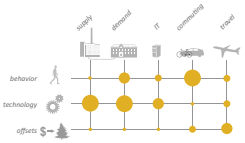
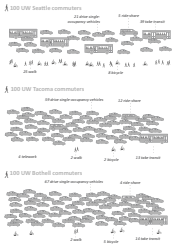












Glossary

CO_2	carbon dioxide
CO_2-equivalent	the equivalent mass of CO_2 required to have the same global warming effect as an identified mass of any other greenhouse gas
CO_2e	CO_2-equivalent
ESAC	University of Washington Environmental Stewardship Advisory Committee
GHG	greenhouse gas – the two that are most abundant in the UW inventory are CO_2 and methane; 1 unit of methane has the global warming potential of 21 units of CO_2
LEED	Leadership in Energy and Environmental Design, a certification program of the U.S. Green Building Council
Mitigation	when applied to climate change, means reduction of GHGs
Offset	a reduction of GHGs attributable to a particular project that can be sold to a party other than the owner of the project
OPB	the UW Office of Planning and Budgeting
Submetering	measuring electric, steam or other energy use on a building-by-building basis, even when energy is supplied by a central utility plant
University Advancement	the fundraising arm of the UW administration
UWESS	the UW Environmental Stewardship and Sustainability Office
Virtualization	the practice of executing computing processes that normally require different pieces of equipment on a single piece of equipment, or enabling a computing process that normally requires a specific piece of equipment to operate on multiple pieces of equipment

1 Introduction

1.1 The UW Climate Action Plan

The UW Climate Action Plan describes commitments being made by the University of Washington (the University, UW) to meet its obligations under the American College & University Presidents' Climate Commitment (ACUPCC). Those obligations include intent to achieve a climate-neutral university having no net greenhouse gas (GHG) emissions. The UW Climate Action Plan (the Plan) sets out broad strategies that will guide us toward that ambitious goal and identifies the actions that can fulfill each of those strategies. Analysis of the financial, environmental and social aspects of the actions will be necessary for prioritization of implementation. This Plan establishes the first steps, identifying the framework strategies and providing a number of proposed actions. The proposed actions will be expanded upon, evaluated and prioritized over the next year, with a detailed Implementation Document produced by September 2010.

The core of our effort is to expand the UW's already rich history of environmental research, education and community outreach. We will build upon our unique capabilities as a world leader in climate research by developing innovative, groundbreaking efforts in interdisciplinary approaches to climate change. We will build on a long history of environmental education to add curriculum development on climate change and integrate our educational efforts with research. We will build upon our reputation for providing talent and knowledge to the Pacific Northwest by preparing the next generations of UW graduates to confront future climate issues with experience and innovation. These are the strategies that will be described in Chapter 2, *Strategies for Academic Engagement in Climate Change.*

The UW's talented, committed and resourceful community is extensive, and we expect to break new ground in bringing the academic and administrative sides of our university together to act in concert to meet the goals of the Climate Action Plan. With a population of roughly 70,000 students, staff and faculty throughout its three campuses, the UW has the size and complexity of a small city. It can function as a research center and test bed for GHG goal-setting, reduction technologies and administrative processes that can be expanded upon by communities and other large organizations in Washington State. Chapter 4, *Strategies for*

Reducing University Emissions, details some of the strategies that will lead our community in mitigating GHG emissions.

The UW will reduce GHG emissions to meet or exceed the goals passed by the Washington State Legislature in April of 2009, requiring Washington state agencies to reduce emissions 15% below 2005 levels by 2020, and 36% below 2005 levels by 2035. Climate neutrality is not specified in the state mandate. The UW, hoping to achieve neutrality by 2050, is unable to set this as the firm target date since the technologies necessary to meet it, and the federal and international policies that can support GHG neutrality, are still emerging. Indeed, accelerated, interdisciplinary work at the University will play an important role in guiding the very developments that will make GHG neutrality possible.

1.2 Climate Action and the UW Vision

The UW Climate Action Plan builds on the University of Washington's Vision Statement, which highlights seven characteristics that make the UW "Uniquely Washington": We strive to be **World Leaders in Research** on several fronts with the science of climate change, on the impacts of climate change, on climate policy and on greenhouse gas mitigation. Through the integrative College of the Environment, we will foster an **Academic Community** that rallies around the multidisciplinary challenges of climate change. Careful attention to the effects of climate on the Pacific Northwest **Celebrates Place**, and **Being Public** means we work with Washington's citizens to manage those effects wisely. In addition to managing the effects, we as **World Citizens** work actively to combat global climate change by bringing our **Spirit of Innovation** to mitigation technologies. Finally, the **UW Standard of Excellence** calls for recruiting the best faculty and staff, pursuing academic excellence and holding ourselves to the highest standard of ethics.

Our Vision Statement is augmented by five goals known as the Grand Challenges, all of which are addressed by the Climate Action Plan:

1. **Attract a diverse and excellent student body and provide a rich learning experience.** The Climate Action Plan connects the UW student experience to the intricate web of relationships required for successful stewardship. The UW educational experience is concretely linked to research and community action, both on and off campus.

2. **Attract and retain an outstanding and diverse faculty and staff to enhance educational quality, research strength and prominent leadership.** The Climate Action Plan boldly places the UW in a leadership position within many research fields and academic disciplines, and should attract visionary faculty and staff. The Plan explicitly calls for supporting new, interdisciplinary faculty positions.
3. **Strengthen interdisciplinary research and scholarship to tackle "grand challenge" problems that will benefit society and stimulate economic development.** Tackling the demands of climate change mitigation and adaptation is quickly evolving to be one of the grand challenges of this century.
4. **Expand the reach of the UW from our community and region across the world to enhance global competitiveness of our students and the region.** Highlighting and expanding the UW's research on global climate change ties our education to the world, while our location in a major Pacific Rim port city reminds us of the tangible implications for trade in climate-related technologies.
5. **Maintain and build infrastructure and facilities to insure the highest level of integrity, compliance and stewardship.** The Climate Action Plan requires integration of UW's physical infrastructure with academic and administrative priorities and policies to identify and make the required trade-offs to create an effective and self-perpetuating path forward.

1.3 History of Climate Action at the University of Washington

The University of Washington has a long history of environment-related teaching, climate-related research, environmental stewardship and energy and resource conservation.

Figure 1 - Climate Action History at the UW

1.3.1 Climate Research and Curriculum

Department of Meteorology
1947

Joint Institute for Study of the Atmosphere and Ocean
1977

The University of Washington has a long history with climate research, beginning in the 1940s with establishment of a climate-focused Department of Meteorology by Professor Phil Church. Today, climate research at the University of Washington is anchored in a triad of organizations: the Joint Institute for Study of the Atmosphere and Ocean formed in collaboration with the National Oceanic and

Climate Impacts Group
1992

Program on Climate Change
2000

Atmospheric Administration, the Climate Impacts Group focusing on climate impacts in the Pacific Northwest and the Program on Climate Change (PCC). PCC, in particular, offers a stage for interdisciplinary climate research through collaboration between the Atmospheric Sciences, Oceanography and Earth & Space Sciences departments, as well as a point of focus for climate science teaching.

Institute for Environmental Studies
1973

Program on the Environment
1997

The UW has a rich history of teaching environmental stewardship across a broad array of academic programs. This capacity was first formalized in the Institute for Environmental Studies in 1973. In October 1995 President Richard McCormick appointed the Task Force on Environmental Education, which eventually led to integration of the University of Washington's environment-related curricula under the Program on the Environment (POE); in autumn quarter 1998 the UW admitted the first students to the BA program in Environmental Studies.

Today, the University of Washington offers a diverse collection of academic programs that focus on environmental policy, climate change and sustainability. In 2009, the University offers over 500 individual courses on its three campuses that focus on or directly relate to climate change and sustainability. Most of the environment-related undergraduate degree programs, including POE's environmental studies program, offer minors that allow students to explore environmental issues while pursuing majors in other fields.

Finally, independent study and Capstone projects connect the learning experience with climate action. POE, the Environmental Management Certificate Program and the Restoration Ecology Network have supported student projects leading, for example, to an analysis of the potential for mitigating GHGs from the Montlake Landfill, recommendations for climate-friendly investing of the UW's endowment, and a sustainability plan for UW Bothell.

1.3.2 Environmental Awareness and Stewardship

Division of Health Services
1947

Institutional action on environmental health and safety dates back to 1947 when the Chair of the Department of Preventive Medicine and Public Health, School of Medicine, recommended the establishment of a Division of Health Services charged with providing on-campus environmental health and safety services. Throughout the 1950s and into the 1960s the University added staff and programs in sanitation, occupational safety, radiation safety, fire safety, waste man-

agement and pollution control. All these entities coalesced into our current Department of Environmental Health and Safety (EH&S) in 1966.

Environmental Health & Safety
1966

During the 1970s and into the early 1980s environmental and health and safety regulations at the federal and state level increased significantly with the Resource Conservation & Recovery Act (RCRA), Toxic Substances Control Act (TOSCA), the National Environmental Policy Act (NEPA) and the State of Washington's State Environmental Policy Act (SEPA). EH&S programs grew to meet the challenges of these new regulations.

Environmental Stewardship Advisory Committee logo

In July 2004, the University issued the Environmental Stewardship and Sustainability statement, declaring: "The University is committed to practicing and promoting environmental stewardship while conducting its teaching, research, and service missions as well as its facility operations in all of its locations." An Environmental Stewardship Advisory Committee (ESAC) was chartered by the Provost and the Executive Vice President; it includes faculty, staff and students from all three campuses and has responsibility for recommending environmental action and developing policy. ESAC coordinated the first GHG emissions inventory, sponsored student capstone projects, recommended new strategies to promote stewardship and sustainability and was the catalyst for many administrative changes.

In March 2007, the University of Washington became a charter member of the Leadership Circle of the American College & University Presidents' Climate Commitment. The commitment involves all three UW campuses. Chancellors at both UW Bothell and UW Tacoma signed the commitment, along with UW President Mark A. Emmert.

In August 2008, based on ESAC's recommendation to the Senior Vice President, the UW office of Environmental Stewardship and Sustainability (UWESS) was created to coordinate and support UW activities and information related to sustainability. UWESS is part of the Strategy Management group, under Finance and Facilities.

The University's institutional focus on stewardship is complemented by strong student involvement, as evidenced by over one dozen student organizations that are active on environmental issues. Students, staff and faculty frequently collaborate on University-wide efforts surrounding environmental stewardship; re-

cent examples include the 2009 *Focus the Nation* climate change teach-in, *What is Sustainability? An Exploratory Symposium* at UW Bothell in 2009 and the 2009 *South Sound Sustainability Summit* at UW Tacoma.

Reaching beyond its own walls, the University of Washington works together with governments, corporations, nonprofits and other academic institutions in the Pacific Northwest and elsewhere. It is a founding member of the Seattle Climate Partnership, which commits many of Seattle's employers to reduce emissions and contributes to meeting the city's community-wide GHG reduction goals. The University hosts many events open to the public, with appeal ranging from families to specialized professional audiences. These events include exhibits at the Burke Museum of Natural History and Culture, educational events at the UW Botanic Gardens, the annual Polar Science Weekend in partnership with the Pacific Science Center, the recent international conference on microplastics in the marine environment at UW Tacoma and the UW School of Law Climate Change Conference on Law, Economics and Impacts.

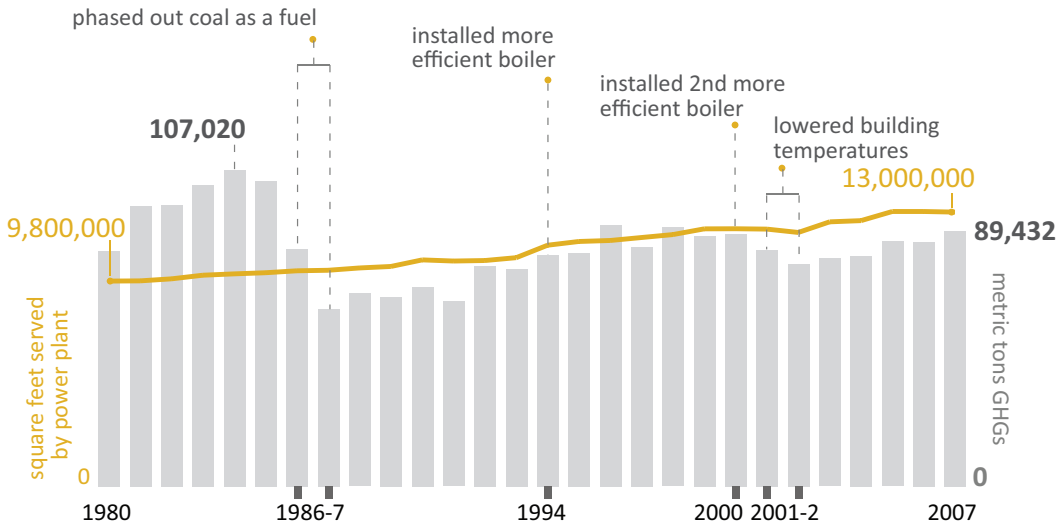
The University's continued attention to environmental stewardship has been recognized with the Sustainable Endowment Institute's highest awarded grade (A-) on the College Sustainability Report Card in both 2008 and 2009.

1.3.3 Early Actions Reducing Emissions

central utility plant
1987

The most important driver of GHG reductions at the UW is energy use. The University of Washington has pursued energy efficiency aggressively for a long time. In 1987 the Seattle Campus' central utility plant began burning natural gas instead of coal, improving local air quality and simultaneously reducing GHG emissions by about 40,000 metric tons CO_2-equivalent ("metric tons") per year. Since that time, high-efficiency boilers have been installed to reduce fuel consumption even further. The effects on UW GHG emissions have been dramatic, as shown in Figure 2.

Figure 2 – Emissions and building size



Since the 1980s the UW has managed to keep GHG emissions from the Seattle campus' central utility plant in check on a per-square-foot basis, thanks to efficiency measures taken both at the plant (the supply side) and at the buildings (the demand side). The gold line shows the increasing square footage served by the Seattle campus' central utility plant, while the grey bars indicate the GHGs emitted in the course of serving that floor area.

Recent capital improvement projects have improved the average efficiency of UW structures through participation in the U.S. Green Building Council (USGBC) Leadership in Energy and Environmental Design (LEED) program. UW properties currently include three Gold, three Silver and one Certified LEED-rated buildings, with 22 additional projects in the design, construction or post-construction stages pending certification. Modern integrated design processes such as these new projects have resulted in an average of 30% energy savings (relative to American Society of Heating, Refrigerating and Air-Conditioning Engineers requirements current at the time of certification) at a 2% increase in initial capital construction cost.

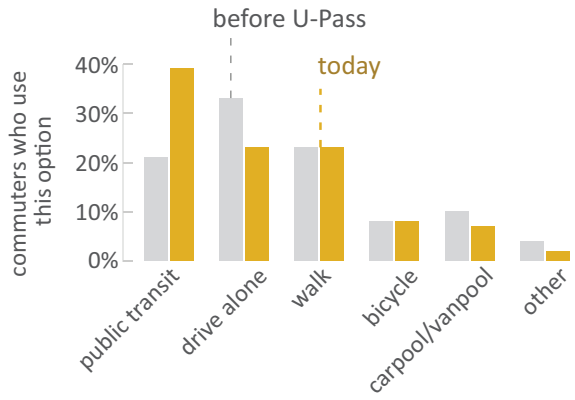
Recent efficiency improvements to the Seattle campus' data center resulted in over 450 kW of reduced electric demand, or a 26% reduction in energy usage throughout the entire building within which the center is housed. Meanwhile, consolidation and virtualization of computing resources is reducing campus-wide energy demand from computing even further. By using virtualization technology, UW Educational Outreach (UWEO) has reduced its number of servers by 20%, with a net savings of nearly 160,000 kW/Hr/Year of electricity from server

operation and cooling, avoiding 95 tons of carbon production per year. At the completion of their rebuild project, nearly 80% energy savings will be achieved, avoiding 475 tons of carbon production per year.

U-PASS
1991

Our students, staff and faculty are enabled to choose energy-efficient commuting modes by our award winning U-PASS program created in 1991. U-PASS encompasses an unlimited right-to-ride transit pass covering six Puget Sound transit agencies, discounted carpool parking, vanpool subsidies, walking and biking programs, merchant discounts including car sharing discounts, plus emergency rides home and discounted occasional use parking for faculty and staff.

Figure 3 - Effect of U-Pass on commuting



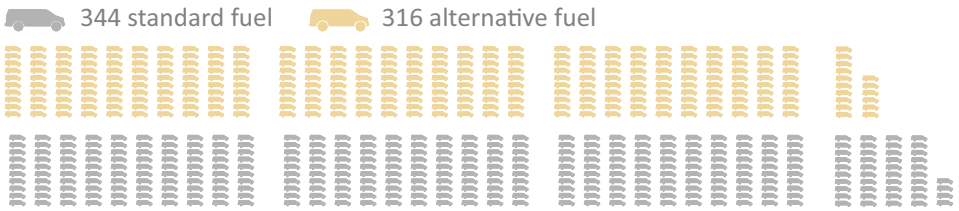
U-PASS has supported a significant shift of commuters from private cars to transit: Today 39% of commutes to the Seattle campus are made by bus, and 30% of trips are by foot or bicycle – producing zero GHG emissions. We heavily promote bicycle commuting through widespread access to bicycle facilities and three team-based bicycle commute campaigns each year. Despite a 24% growth in the employee and student population between 1990 (the year before the launch of U-PASS) and 2007, there were fewer vehicle trips to campus per day in 2007 than in any of the previous 24 years. On the Bothell campus, a rideshare email subscriber list implemented jointly with the adjacent Cascadia Community College provides an additional mechanism for reducing commuting emissions.

Professional air travel involves substantial GHG emissions but plays a vital role in research, teaching, and administrative activities at UW. The University has a modest but expanding set of videoconferencing facilities which already provides an alternative to some of the functions of long-distance travel. To make a significant impact on air travel, the use of videoconferencing would have to grow enormously and this, in turn, entails a host of technical and cultural challenges. We propose that the University embrace these challenges and thereby play a leadership role in developing a more sustainable form of global-scale communi-

cation. At the same time, we recognize that many functions of long distance travel (e.g. field research, face-to-face meetings at conferences, recruitment visits for prospective students and faculty) cannot be replaced by videoconferencing and will therefore have to be addressed via carbon offsets.

Of the University's vehicle fleet, (316 light, medium duty and heavy duty vehicles out of 660 total) 48% are alternative fuel vehicles such as flex-fuel, biodiesel, hybrid, plug-in hybrid electric and all-electric vehicles; our fueling infrastructure currently offers a B20 biodiesel blend and is positioned to offer B100 and E85 when the emerging market products are made reliably available. Efforts to reduce the fleet will also be explored

Figure 4 - Alternative fuel vehicles



2 Strategies for Academic Engagement in Climate Change

This chapter presents a set of initial strategies the UW will explore to leverage its strengths as an *academic* institution to make a significant contribution to climate stewardship. Research, teaching and outreach are all components of discovery, the heart of the University. We educate a diverse student body to become responsible global citizens and engage these students in addressing climate-action and environmentally-sustainable issues through guided research and academic inquiry.

College of the Environment
2009

A landmark initiative in the UW's academic engagement with the environment is the new College of the Environment, opening Fall 2009 just as the Climate Action Plan is being released. The new college brings together a critical mass of academic units and interdisciplinary scholars to lead in the development of strategic plans for curriculum enhancements; for innovative research into science, technology, and public policy; and for effective outreach initiatives. This opens vast but as yet unfocussed opportunities for detailing and expanding the strategies in this chapter of the Climate Action Plan. New ideas will be spawned as the incipient College incorporates more academic science units, builds affiliations with

other departments and individual faculty members, hires its first permanent dean and opens internal discussion about its mission and strategic plans. Expert and thoughtful planning for climate research in the sciences and technology will emerge from leadership within the College of the Environment by the end of 2010; this Climate Action Plan considers only complementary issues.

2.1 Research

Research is at the heart of inquiry and discovery at the UW, attracting some $1.2 billion in grant funding as of 2007, one-third of the University's total budget. We firmly believe that engaging our students, graduate and undergraduate alike, in climate and environmental research will support and inform their engagement as active citizens during their campus years and beyond. Our goals for climate-related research, in all schools/colleges engaged in environmental work, are:

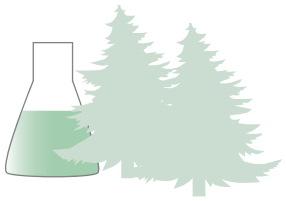
- continue the UW's position as one of the leading universities in research on climate science and climate impacts;
- guide our students on all three campuses into a rich matrix of environmental scholarship opportunities that excite them;
- spread environmental research and scholarship beyond its traditional campus boundaries in science and technology; and
- link the academic and administrative communities in joint projects that are likely to contribute directly to UW's climate goals in this report.

To achieve these goals we will interconnect and expand our multi-campus, multidisciplinary research activities, and remove structural impediments that hinder coordination. Undergraduate students will be provided with research opportunities across our campuses through venues that allow them to discover and connect. We will also make a special effort to support young research faculty, particularly in economic, social and technical facets of climate studies, who enter colleges or departments that have little or no prior engagement in these areas of research. UW's professional degree offerings can be expanded to fill the region's growing need for environmental stewardship and leadership.

The Environmental Institute, soon to form within the College of the Environment, is designed to engage the entire UW community in environmentally-related research. The Environmental Institute will be a central hub for combin-

ing scholarship in the core sciences and technologies present within the UW, with academic disciplines such as business, economics, law, ethics, political science, public policy, built environments and public health and with administrative areas such as Facilities Services, Environmental Health and Safety and UW Technology. As a benefit, many of our scientific and technical research programs can be enriched with social, business and policy dimensions that unite students and faculty from across the campus(es) in common purpose and teamwork. Once again, what we offer here will be greatly expanded upon by work within the new College.

*2.1.1 **Strategy:** Foster Undergraduate Participation in Environmental Research*



environmental research

The University and the Puget Sound region offer an array of research opportunities to UW students. Undergraduate students from every discipline and campus, most of whom are facing an institution of the UW's size and complexity for the first time in their lives, must have guidance to find meaningful research and off-campus internship opportunities.

Access is just one part of the student engagement process. Financial support of undergraduate environmental research requires on-going funding of research efforts outside the formal curriculum and during the summer. Support needs to be made available at UW Seattle, UW Bothell and UW Tacoma. These endowments can be targets for University Advancement.

Proposed Actions: Each strategy in the Climate Action Plan will be followed with a brief list of Proposed Actions that are intended as a seed and inspiration for the complete analysis of options we will publish in 2010. The Proposed Actions also provide a more concrete anchor for visualizing how each strategy might be implemented. For this strategy, Proposed Actions include: Create a web-based clearinghouse for current environmental research opportunities in the sciences, engineering, public health and the social sciences; include in the clearinghouse descriptions of exemplary recent student accomplishments, and provide clear explanations of how to pursue opportunities; and make undergraduate research scholarships available on all campuses.

environmental scholarship

*2.1.2 **Strategy:** Support Junior Faculty in New Areas of Environmental Scholarship*

Profound change occurs across generations. Hence junior faculty are essential for building new research foci across each campus. They are also the key to establishing UW's national reputation in environmental scholarship. Senior level leadership will be needed to ensure that new faculty hired for environmental scholarship have the opportunity to develop into nationally recognized scholars, especially in academic units for which environmental scholarship is novel.

Additionally, young faculty must be mentored expertly and evaluated using clear and sensible criteria. One concern is that many young faculty entering departments with little prior engagement in environmental scholarship may need support from elsewhere if they have a cross-disciplinary interest in environmental topics. They will need seed support for their research, peer acceptance and fair evaluation for such activities, encouragement by strategic plans in their units and mentoring that cuts across departments on all three campuses. The UW's professional programs, for example in Business, Public Affairs, Public Health and Forest Resources, have significant experience with interdisciplinary hiring and promotion criteria that can be tapped.

Proposed Actions: Develop a high-level, tri-campus strategy for hiring, support, promotion and tenure and merit criteria of new faculty with environmental scholarship focus. Develop a pool of expert research peers across the globe for assisting with decisions of promotion and tenure.

environmental focus in professional programs

*2.1.3 **Strategy**: Expand Environmental Foci to UW's Professional Degree Programs*

UW's professional programs, for example public policy, law and business, have had profound impacts on the economic and social vitality of our region. These professional degree programs will need to assume new and, in some cases, unfamiliar roles in developing community leaders with environmental specializations. We have already seen sustainable business practices and environmental law incorporated into professional training, but a fast-growing concern about climate change will create new demands for professional training, perhaps in GHG allowance accounting and trading, international climate policy and ethics or municipal climate policy development.

The Evans School of Public Affairs is ranked in the top five environmental and resource policy and management programs in the U.S. It has already taken significant steps through concurrent degree programs with the School of Forest Resources and other schools, through hiring of new faculty with environmental expertise and through its 40-year focus on Environmental Policy and Management. The College of Built Environments is also expanding its environmental focus through some of its new professional course offerings. Similar efforts in other departments could reach deeply into other areas of regional life.

Proposed Actions: Develop both strategic priorities and implementation plans for high-quality environmental professional degree programs or courses in relevant schools and colleges.

academic-administrative collaboration

*2.1.4 **Strategy:** Foster Collaborations between Academic and Administrative Activities*

The administrative strategies described in Chapter 4 are also research opportunities for students and, in many cases, faculty. As one example, some of the technology shifts for the Seattle campus central utility plant described in Section 4.1.4 are engineering research projects significant enough to support Ph.D. dissertations. Smaller projects, such as better bicycle and pedestrian access to campus or fostering new technologies in buildings and office practices, can easily engage teams of undergraduates. A coordinating infrastructure that closes the gap between administrative and academic activities on the campus is desirable.

Proposed Actions: Develop an approach to link the UW environmentally focused academic units with administrative units to provide research opportunities for students and faculty.

2.2 Curriculum

The new College of the Environment initially will begin as an academic community of nationally-renowned natural science departments (Atmospheric Sciences, Forest Resources, Earth & Space Sciences and Marine Affairs) on the Seattle campus. Within each are large and established multi-disciplinary research programs and centers (*e.g.*, Joint Institute for the Study of the Atmosphere and the Oceans, Climate Impacts Group and the Bio-Resource Science and Engineering interest group). The College will also include the interdisciplinary Program on

the Environment, connecting the College to biology, statistics, and policy studies at UW Bothell and nearly 30 other departments and programs across the tri-campus system.

The member units will retain their innovative disciplinary teaching programs while new interdisciplinary undergraduate and graduate degree programs are created to foster understanding. Meanwhile, the Tacoma Campus is in the process of expanding its offerings further by adding a Bachelor of Science in Environmental Engineering, a Bachelor of Arts in Sustainable Urban Development and a Master of Science in Environmental Science and Engineering.

Spanning both Curriculum (this section) and Outreach and Engagement (Section 2.3), University of Washington Educational Outreach offers another important platform for Climate Action Plan academic efforts. Educational Outreach administers continuing education programs and online learning for working adults, including a growing number of environment and sustainability certificate programs such as Environmental Law and Regulation and Wetland Science and Management. Educational Outreach has also established two national partnerships that focus on sustainability: *Action, Sustainability and Growth*, which has created two programs and will soon launch a green human resources certificate program; and *R1edu*, developing and offering short courses about sustainability at the UW, the University of Wisconsin, the University of Toronto and UC Irvine.

*2.2.1 **Strategy:** Develop Environmental Literacy*

Environmental education for everyone

All students across the University should have the opportunity to learn about the environmental challenges that face modern society and their potential consequences. Potential topic areas include environmental systems, climate change, sustainable practices, human welfare, social implications, policy implications and economic implications.

Proposed Action: Develop environmental literacy courses at the College of the Environment that all students may take as part of their general education requirements.

Environmental education across domains

*2.2.2 **Strategy:** Enhance Interdisciplinary Environmental Instruction*

The College of the Environment plans to create two new units focused on human dimensions and technology and engineering to provide opportunities for faculty members from diverse disciplines, such as social science, law, public policy and engineering, to come together to create interdisciplinary environmental courses and academic programs. In addition, students from across campus will be able to earn interdisciplinary minors to complement their major programs of study. Discussions need to be initiated with other Colleges to create mechanisms to allow individual faculty members to participate in this interdisciplinary endeavor. **Proposed Actions**: Establish interdisciplinary units or centers at the College of the Environment. Offer joint appointments allowing faculty to retain a relationship with their existing department while joining an interdisciplinary unit.

Collaborative environmental education

*2.2.3 **Strategy:** Explore the Boundaries between Disciplines*

Understanding the environmental challenges and opportunities for mitigating the effects of human activity will require an exploration of the boundaries between the many disciplines represented in the College of the Environment and across the University. Not only is research needed, but students need to have an opportunity for this exploration in their curriculum. Individual courses need to be created that are collaboratively taught by members of the various disciplines.

Proposed Action: Develop courses at the College of the Environment that are collaboratively taught by faculty members from multiple disciplines; these courses will focus on exploring the relationships among the various disciplines and the boundary space between them.

2.3 Outreach and Engagement

The university already disseminates a tremendous amount of information on its environmental and sustainability research, education and operational programs through websites, newsletters, annual reports, news articles, posters and administrative communications (*e.g.*, President's Town Hall). Specific, existing resources that are available to communicate messages associated with the Climate Action Plan include:

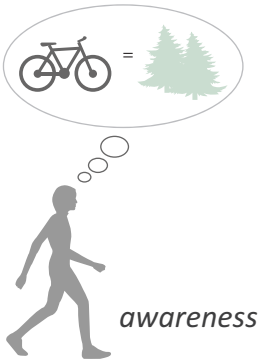
- Websites for UW Environmental Stewardship & Sustainability Office, relevant academic programs (*e.g.*, College of the Environment), and for UW Marketing
- e-communications;
- Online calendar and weekly listserv of environmentally-related events (both on- and off-campus);
- Competitions and peer challenges;
- Sustainability toolkits for departments, instructors and K–12 teachers;
- The university daily newspaper, *UW Daily*, and faculty/staff magazine, *University Week*;
- Departmental newsletters;
- News and Information releases;
- Educational posters in residence halls, dining facilities and offices;
- The university newsletter for campus neighbors, *Front Porch*;
- The UW Botanic Gardens website, an important interface to the larger Seattle community

When implementing specific communications tactics, special attention should be paid to ensuring that they themselves are environmentally responsible.

There are two communities that need to be engaged when implementing the UW's Climate Action Plan: first, the broad community of UW stakeholders who make individual and collective decisions that determine the university's GHG footprint; and second, external constituents of the university who have an interest in how we operate. The former requires us to develop strategies to engage the entire UW community (*e.g.*, administrators, staff, faculty, students, alumni, trustees and legislators) so that there is broad buy-in and support for goals of the Climate Action Plan. These strategies will support the implementation of the Plan and dramatically increase the probability of success. The latter will require us to consider what key messages will be important to share with the public and our partners to make sure they are aware of the UW's participation in and progress toward implementing the Climate Action Plan.

Three primary goals will be critical in developing a comprehensive communications strategy that supports the UW's Climate Action Plan. The communications

strategy will need to build toward: Awareness, Positive Attitude and Positive Action.

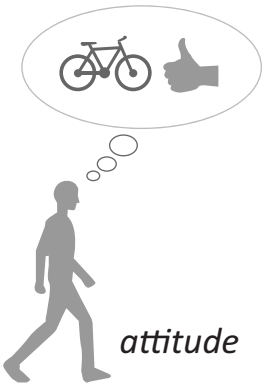


*2.3.1 **Strategy:** Awareness*

Success of the Climate Action Plan is dependent in part on creating a broader understanding of the science and policy behind the goals of ACUPCC, as well as the actions being taken by UW. The information must be transparent, easily accessible and specifically geared toward a variety of audiences. Because immediate, local threats are generally perceived as more salient and of greater urgency than global problems, messages should highlight current and potential local and regional climate change impacts. Yet it is important to openly acknowledge uncertainties in the likelihood and severity of potential impacts, exhibiting an appropriate respect for scientific uncertainty and maintaining the University's role as a credible source of objective information.

Concern for the climate should be a topic of everyday life at the UW, with daily reminders like climate-related purchasing standards (7.4.3) and highly visible Web placement keeping the topic in view. Encouraging individual and department-level reporting also keeps climate impacts in constant view. Finally, the University needs to make its endorsement of the Climate Action Plan clear by proactively distributing the information to its constituents, in particular packaging it for easy use by the media and other organizations that would be interested in the actions being taken by the University to mitigate its GHG footprint.

Proposed Actions: Distribute press kits. Establish department- and individual-level reporting tools. Include informational pieces on climate change and mitigation efforts in the UWESS web portal. Develop a sustainability walking tour (with an online component) to highlight specific university efforts. Incorporate sustainability information into undergraduate orientation and new faculty and staff orientation.



*2.3.2 **Strategy:** Positive Attitude*

Even though a broad understanding of environmental science and policy will be critical to making long-term changes in the UW's GHG footprint, it will not be sufficient. A recent study from Yale University showed that although 92% of Americans know about the issue, it remains a low priority relative to other issues

and lacks urgency. There is a significant gap between the percentage of people with an awareness of climate change and those taking action to solve the problem, and it is principally due to the ineffectiveness of typical climate change communication strategies. The intent is to foster an attitude that motivates people and helps people participate in the University's commitment to the Climate Action Plan. Thus, the communications surrounding these efforts must create a sense of teamwork in the UW community by instilling the notion that, combined with the efforts of their colleagues, students and friends, an individual can have a larger impact. These messages will need to evoke hope and encouragement to enable action and avoid provoking guilt or fear.

Proposed Actions: Share examples of 1) concrete actions initiated by both individuals and administrative policy; 2) quantitative improvement in the University's GHG emissions; 3) opportunities for individuals to gradually integrate new habits into their every-day routine; and 4) actions that have multiple positive benefits. Prizes and awards can also be significant motivators (*e.g.*, Ride in the Rain).

action

2.3.3 ***Strategy:*** *Positive Action*

An understanding of climate science and policy and a positive attitude do not necessarily translate into a change of behavior towards positive action. In order to stimulate behavioral change, it is necessary to create both incentives and a sense of urgency or desire to act at the personal level. In order to bridge the awareness/action gap, it is essential that we develop communication strategies that are capable of fostering personal behavior change.

Beyond simply creating the desire to act, specific strategies for meaningful action must also be provided. It will be effective to highlight opportunities that are likely to be acted upon by many different constituents, such as opportunities that are convenient, save money, are comfortable or are otherwise desirable. Information about actions already taken at the UW that are replicable provides accessible examples. Even information about what did not work at the UW could help individuals direct their actions toward effective actions.

Proposed Actions: Demonstrate commitment by leading by example. Disseminate information that promotes participation (contact info, opportunities to re-

spond and guidelines for participation); showcase personal stories and provide information on GHG reduction and other metrics.

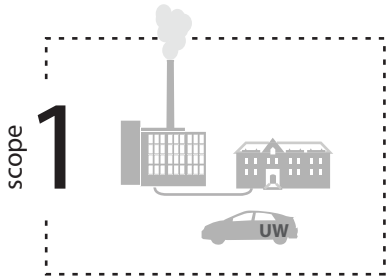
3 University Greenhouse Gas Emissions and Emission Targets

The University of Washington has been tracking annual GHG emissions since 2005. The UW has also calculated emissions for its GHG management baseline year, 2000.

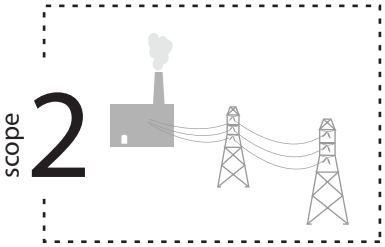
The UW GHG inventory accounts emissions from all equipment and property owned by the University of Washington. This includes three campuses located in Seattle, Bothell and Tacoma, Washington. The inventory also includes minor facilities scattered throughout the state. The Seattle campus supports about 94% of the UW's total headcount of nearly 70,000 students, staff and faculty, and therefore dominates the GHG inventory.

The inventory follows the Implementation Guide published by ACUPCC and the *GHG Protocol* published by the World Business Council for Sustainable Development/World Resources Institute. The *GHG Protocol* prescribes that emissions be reported in three different categories, or "Scopes":

Scope 1 – Direct Emissions, includes emissions that originate from real estate and equipment owned by the University. On-site natural gas heating and vehicle fleets are examples.



Scope 2 – Energy Imports, includes emissions from power plants that generate the electricity purchased by the University.



Scope 3 – Other Emissions, includes any sources of emissions that are not included in Scope 1 or 2, for which the University wishes to take responsibility. An example is emissions from vehicles used by commuting students, faculty and staff.

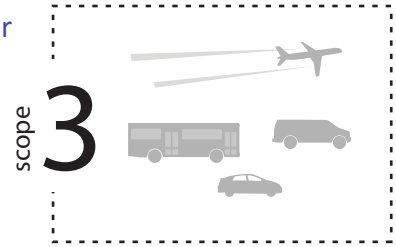


Figure 5 – Emission history by source. Emissions from major sources at the University of Washington, 2000 through 2008. Emissions from each source are shown separately, and the sources are labeled with their *GHG Protocol* Scopes. Actual inventories have been conducted for the years 2000, 2005, 2006, 2007 and 2008. The inventories for the years 2001, 2002, 2003 and 2004 are estimates interpolated between the years 2000 and 2005.

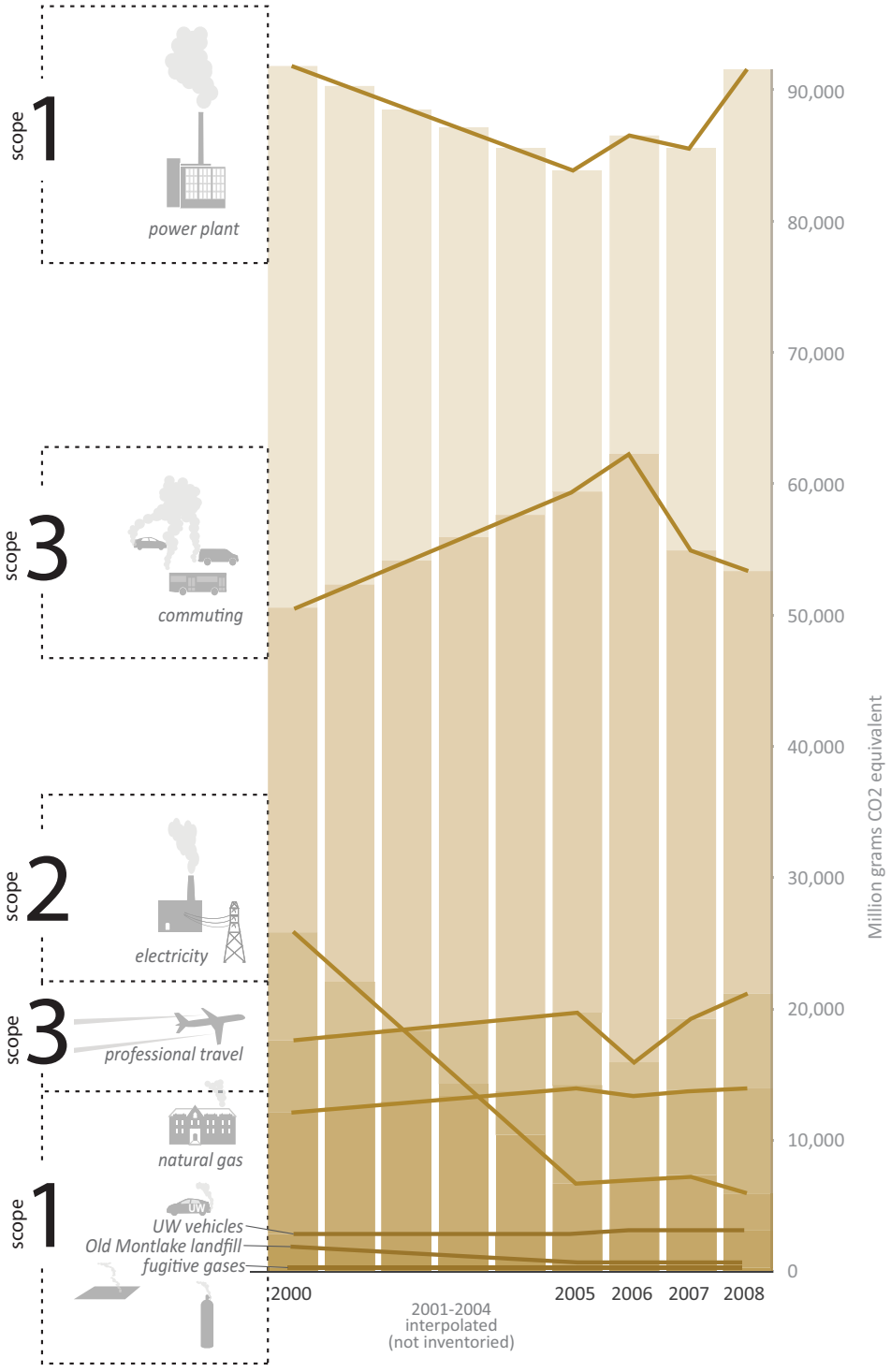
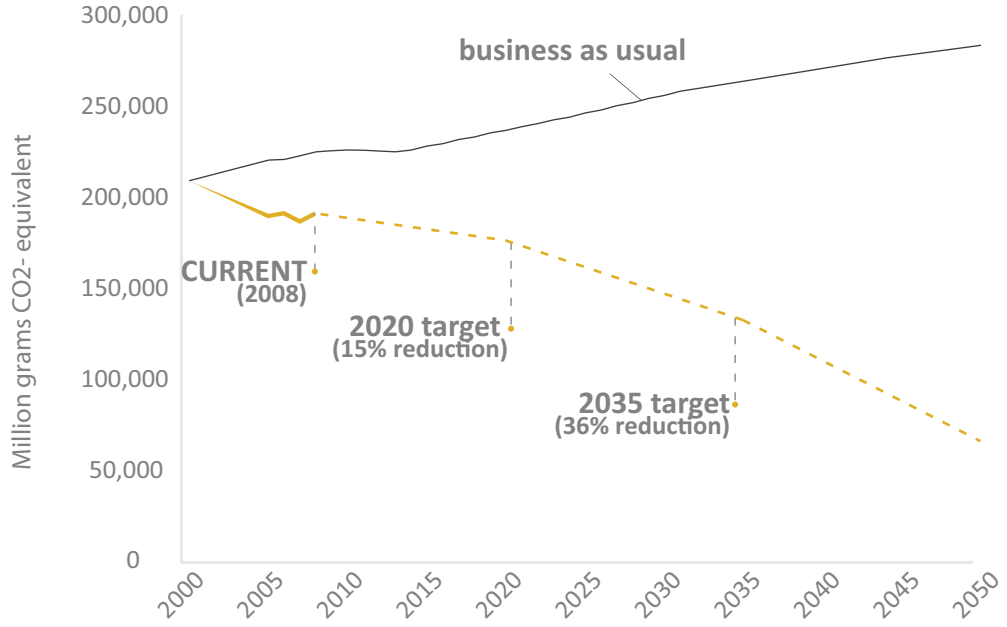


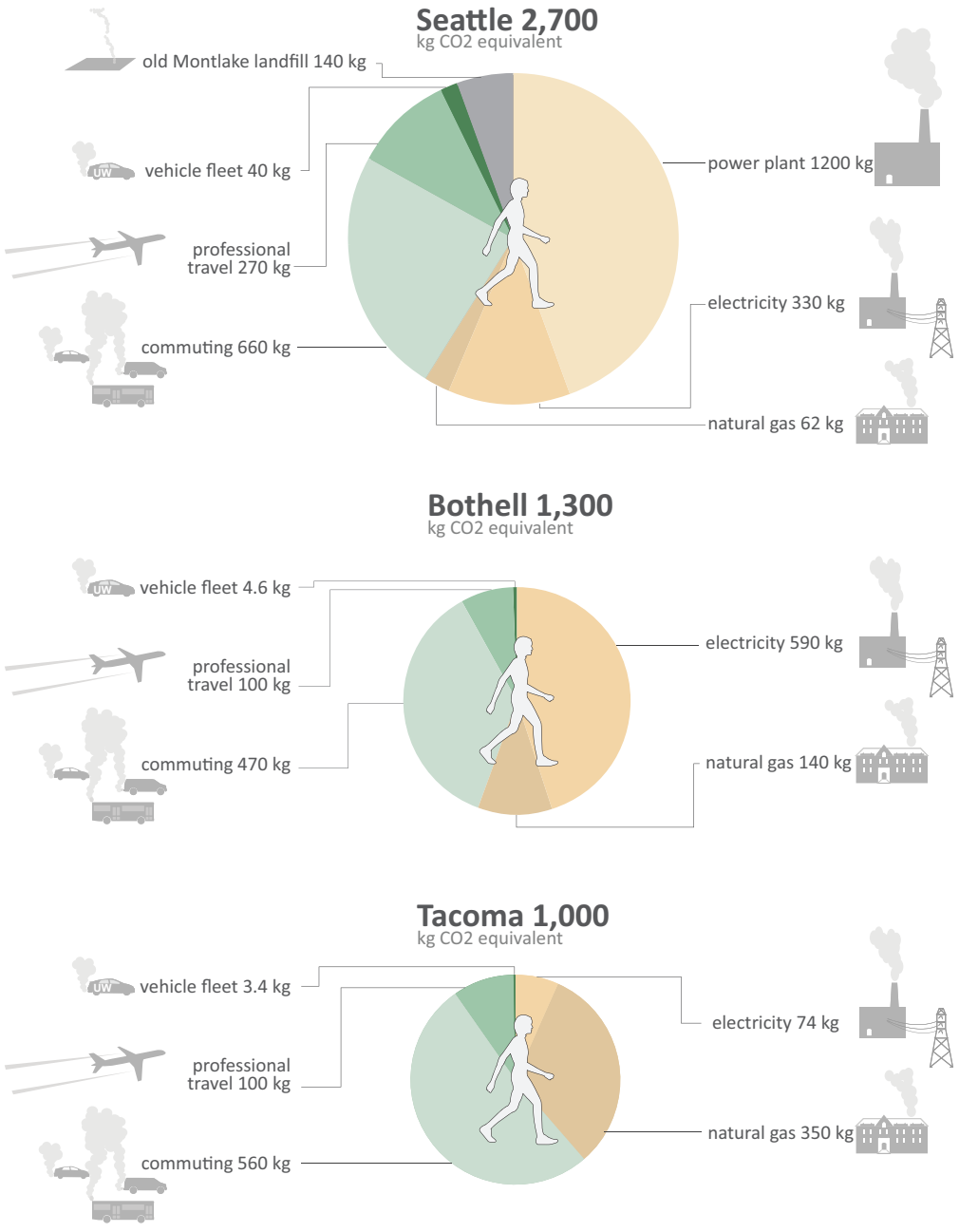
Figure 5 shows that within each scope, different categories of sources show different trends in their emissions from 2005 through 2008, and relative to 2000. For example, Scope 1 emissions from the central utility plant dropped below their baseline levels after 2000, but have been climbing since 2005. Scope 2 emissions dropped steeply after 2000, driven primarily by policy changes at Seattle City Light, the electricity supplier for the Seattle Campus. Scope 3 emissions attributable to students, staff and faculty commuting are above the baseline, but show a decreasing trend. 6 shows the total emissions in the inventory – the solid gold line shows actual emissions from 2000 to 2008, and the dotted gold line shows the trajectory we expect to follow in meeting our GHG targets.

Figure 6 – "Business as usual" projection. The grey, "business as usual" line estimates the path emissions would have taken from 2000 to 2050, absent any policy or behavior changes since 2000. The solid yellow line shows actual emissions from 2000 to 2008. The dashed yellow line indicates the path emissions are expected to take from 2009 to 2050, with implementation of the Climate Action Plan.



The UW's total emissions have fallen substantially from the baseline year (2000) to the latest inventory year (2008). The early reduction is driven in part by Seattle City Light's commitment, as of 2005, to provide zero GHG emission electricity. It has also been driven by an aggressive energy conservation plan on the Seattle campus, keeping building energy use constant, despite increasing campus population and floor space (see Figure 2).

Figure 7 – Per-capita emissions by campus. The area of each pie chart is equal to the campus emissions divided by the total number of students, staff and faculty affiliated with the campus. Not to be confused with total emissions, for which the Seattle campus would dwarf the other two. Numbers printed on each wedge indicate the area of the wedge, in kilograms of CO_2-equivalent. All values are rounded to two significant digits.



Comparing the University's three campuses yields some interesting information about how GHG emissions are generated. Since the campuses are different in

size, we can compare them only by generating estimates of per-capita emissions, dividing the gross campus emissions by the total number of students, staff and faculty associated with that campus. Figure 7 shows that employees and students on the Seattle campus are associated with the largest GHG "footprint," and Tacoma with the smallest.

Approximately 1,200 kg of the 1,500 kg Scope 1 emissions per Seattle capita are attributed to the central utility plant, which provides steam to heat the campus. The Scope 1 emissions at the other two campuses are due primarily to combusting natural gas for heating buildings, but at a smaller scale than performed at the Seattle campus' central utility plant. Scope 2 emissions at the Bothell Campus are higher because the utility that supplies electricity to the Bothell Campus (Puget Sound Energy) has a much larger share of coal in its energy mix than Seattle City Light and Tacoma Power, which serve the other two campuses. The combined Scope 1 and Scope 2 per-capita emissions at the Seattle Campus are significantly higher than at the Bothell Campus or Tacoma Campus. There are several reasons, including the high number research facilities, a Medical Center and significant on-campus student housing located at the Seattle Campus. The Seattle Campus' larger load of Scope 3 emissions is related to the higher proportion of employees to students at this campus related to its research focus and medical center operations. Students generally live much closer to campus and have a smaller commuting footprint than staff or faculty. Furthermore, the greater presence of research staff on the Seattle campus means there is a larger amount of professional travel per capita.

The State of Washington has set GHG reduction targets for state government by law (engrossed second substitute senate bill 5560 of the 61st Legislature, 2009). The law requires:

- By 2020, reduce emissions 15% below 2005 levels;
- By 2035, reduce emissions 36% below 2005 levels;
- By 2050, reduce emissions the greater of:
  - 57.5% below 2005 levels, or
  - 70% below business-as-usual levels projected for 2050.

The legislation does not specify a methodology for determining the projection necessary for determining a 2050 target.

With this Climate Action Plan, the University of Washington adopts, as a minimum, these reduction targets legislated for state government. In addition, the University of Washington hereby states its intention to achieve zero GHG emissions by, or as soon after 2050 as technology will allow.

4 Strategies for Reducing University Emissions

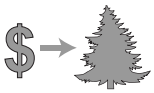
The University of Washington plans to reduce GHGs through an integrated strategy combining three approaches:

behavior

1. Most preferably, students, staff and faculty will adjust behaviors to increase energy efficiency and reduce emissions. Education, incentives, policies and standards, and possibly pricing signals will be deployed to affect behaviors. Approximately 20% of the necessary reductions through 2035 are planned to be achieved through behavior change.

technology

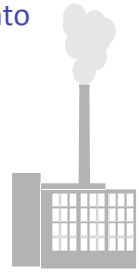
2. Secondarily, technology will be deployed to reduce energy consumption, to acquire energy from less GHG-intensive sources or to reduce direct emissions of gasses. We expect that, on intermediate time horizons, technology can provide about 60% of the UW reduction goal.



offsets

3. Where behavioral or technological options do not exist, the University can purchase and retire allowances issued in GHG regulatory systems, or purchase open-market GHG offsets, to induce reductions outside of the UW campus and community. It is our ambition to limit this approach's contribution to the UW reduction plan to 20% or less by 2035.

Besides viewing GHG mitigation strategies through this lens, strategies can also be divided into categories depending on the institutional system or sector they address. In Sections 4.1 through 4.5 below, strategies are divided into these five categories:



supply

1. Campus Energy Supply includes strategies that address the large infrastructures that supply energy to the buildings and equipment on the UW campuses;

demand

2. Campus Energy Demand includes strategies that address the demand for energy from buildings and equipment;

3. Computing strategies address demand for energy from data centers and from distributed computing resources;

information technology

4. Commuting strategies address emissions associated with student's, faculty's and staff's daily commutes to UW campuses and facilities; included in our scope of responsibility and

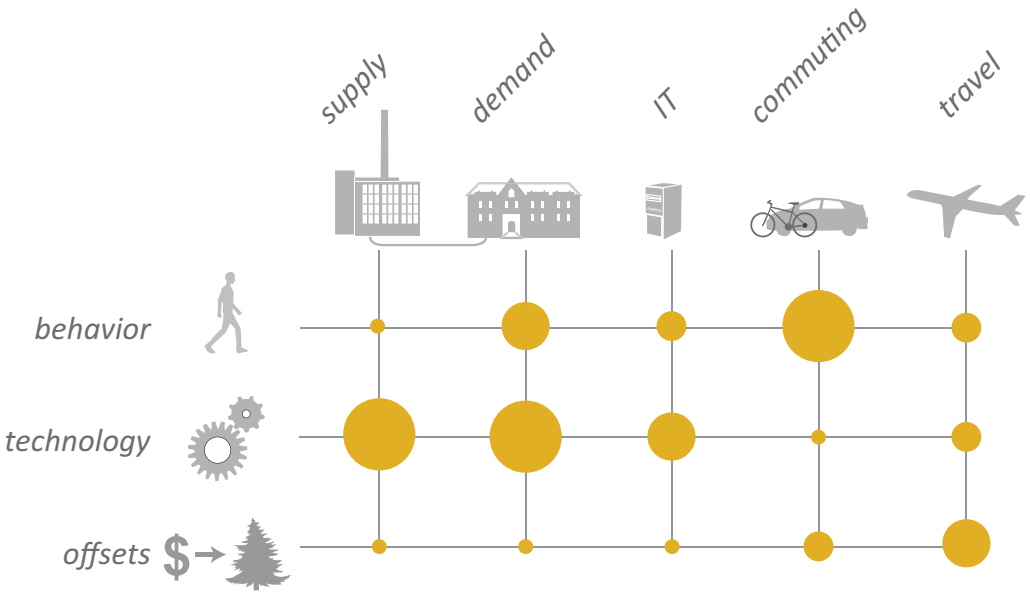
commuting

5. Professional Travel strategies provide opportunities to address emissions from air travel to academic conferences and other meetings, and from use of the UW vehicle fleet.

travel

Combining the categories with the approaches results in a simple 5×3 matrix that is a convenient way to classify the GHG mitigation strategies developed in the UW Climate Action Plan, see Figure 8.

Figure 8 – Strategies vs. emission sources. Five different emissions categories, each of which can be approached with three different methods. Each category is more or less amenable to behavior vs. technology approaches; while offsets, the method of last resort, can be applied with equal ease to any category. The sizes of the circles at each grid intersection indicate the anticipated, relative contributions of behavior, technology and offsets to each emission category. In practice, the relative contributions will be determined in the Implementation Document, and may be strongly affected by a cap-and-trade plan such as that described in Section 6.2.1



Within each of the five emission categories, it is our intent to achieve the greatest amount of reduction possible through the behavioral approach first. However, each category has a different amount of room for cost-effective change through behavior, and what cannot be achieved through that approach will be attacked with technology instead. Finally, if technology is not up to the task of meeting our emission reduction goals, the UW will search for high-quality offsets to make up the difference. Unlike the behavioral or technological approaches, offsets are equally applicable to all five categories.

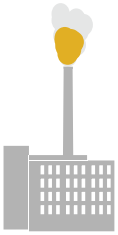
4.1 Campus Energy Supply

Most of the University of Washington's Scope 1 and Scope 2 emissions are attributed to fossil fuels burned for heating, processing steam and electricity in our built environments. The majority of these GHG emissions from Scope 1 occur at the Seattle Campus central utility plant, which burns natural gas to produce steam for heating campus buildings, uses electricity to chill water for cooling and generates a small amount of electricity supplementing electricity received from the grid.

Grid electricity at the Seattle campus is provided by Seattle City Light and is GHG neutral. Most of Seattle City Light's electricity is produced from hydropower or other GHG neutral sources, and the utility purchases and retires GHG offsets each year to cover any remaining power derived from fossil fuels. Even though Seattle City Light intends to meet future demand with renewable energy, the UW still aspires to reduce Seattle campus electricity purchases to minimize the offset burden on Seattle City Light.

Electricity at the Tacoma campus, like that at the Seattle campus, consists primarily of hydropower but includes some fossil-fueled resources; however, Tacoma Power does not purchase offsets on behalf of its customers like the Seattle utility.

Each building at the Bothell campus is heated with its own natural gas-fired boiler system, but cooling is supplied by a central plant that generates chilled water with electricity. The Bothell campus utility is Puget Sound Energy; about 47% of its resources are fossil-fueled, so the GHG penalty of electricity use at the Bothell campus is much higher than the other two campuses.



increase plant efficiency

4.1.1 ***Strategy:*** *Central Utility Plant Efficiency*

Generating steam by combusting natural gas in the Seattle campus' central utility plant is the University's largest single source of greenhouse gas emissions. The steam, as well as chilled water, is delivered to the various buildings on campus through a distribution network including more than ten miles of steam pipes in underground utility tunnels. Opportunities for reducing emissions from the plant can be divided into those affecting the plant itself and those affecting the distribution infrastructure.

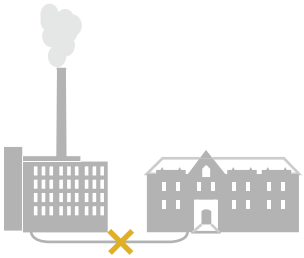
At the plant, some efficiency gain might be achieved with no equipment investment at all, representing our preference for behavioral change over new technology – in this case the behavior change is one of administrative practices. By revising the central utility plant operating procedures to favor the most efficient boilers, the UW can minimize the practice of banking "stand-by boilers" for guaranteeing reliable service.

Turning to technology, numerous vintage, high-horsepower electric motors that drive pumps used for circulating cooling water, condensing water and boiler feed water can be replaced with modern, more efficient electric motors. Another more capital-intensive improvement would be to recover waste heat from the flue gas system, and use the recovered energy to heat buildings in close proximity to the plant.

In the distribution network, heat is lost as steam travels through the pipes, and improvement to the thermal insulation surrounding the pipes would reduce heat loss and the demand on the central utility plant. Some energy is also lost to occasional steam leaks; implementing a preventive maintenance program would reduce the frequency of the leaks, once again appealing to behavioral approaches. In the chilled water distribution system, new pressure-independent control (PIC) valves could improve hydraulic pumping efficiency.

Proposed Actions: Accelerate adoption of a steam leak maintenance program. Accelerate revisions to boiler operating procedures. Immediately begin design of electric motor replacements and PIC valves. Launch engineering study of thermal piping insulation improvements and feasibility study of flue gas heat recovery.

*4.1.2 **Strategy:** Discourage Non-Electric Interconnections*



fewer non-electric interconnections

Unless a major technology shift occurs at the central utility plant (Section 4.1.4), creating a new connection to the plant induces additional combustion of GHG-intensive fossil fuels. When new or renovated buildings are heated electrically, the associated GHG emissions will be much lower than if heated with a steam interconnection. Though the new electricity demand can be satisfied with a GHG-neutral source, the demand should still be minimized by utilizing the most efficient electric heating technology, for example ground-source heat pumps or sewer heat recovery systems.

The GHG reduction achieved will be somewhat dependent on the building site; sites located further from the central utility plant or requiring new extensions to the distribution system, would experience greater thermal losses in distribution, and should be preferred candidates for electric-only interconnections that do not demand central utility plant steam or chilled water.

Proposed Actions: On the Seattle campus, implement a moratorium on new central utility plant interconnections. Apply electric-powered, low-GHG and high-efficiency heating and cooling methods.

*4.1.3 **Strategy:** Measure and Monitor Building Performance*

measure & monitor buiding performance

This strategy does not reduce GHGs directly; rather, it provides data enabling reductions in the Campus Energy Demand category, 4.2 below. Measuring and monitoring building performance is a technological strategy that enables multiple behavioral strategies.

The quantities of natural gas, oil and electricity consumed at the Seattle Campus central utility plant are carefully measured, recorded and tracked. However, the distribution of steam and chilled water, and redistribution of electricity, to the various buildings supported by the central utility plant is not universally measured. In this strategy, the UW will install automatic, networked metering of all buildings to allow for near-real-time, online monitoring of all energy use. An online "electronic dashboard" could provide immediate behavioral feedback directly to building users, but perhaps even more valuable would be the ability to create an online energy database of all buildings on all campuses. For each building, the database could identify total natural gas, electricity, steam and

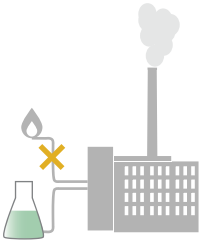
chilled water consumed over time, together with corresponding estimates of greenhouse gases generated. The database could be used for setting building-by-building energy use goals driving behavioral changes and targeting buildings in need of additional, technology-based approaches.

The Bothell campus consists of relatively new construction and features modern metering infrastructure, making it a candidate for early implementation of an electronic dashboard system, perhaps as a test bed for the much larger project of monitoring the Seattle campus.

Proposed Actions: Create baseline energy and water use information for all buildings on all three campuses. Provide additional metering with online capabilities as appropriate. Monitor building performance and use information to identify energy conservation opportunities.

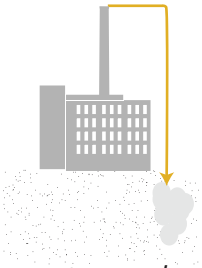
*4.1.4 **Strategy:** Central Energy Supply Technology Shift*

While Strategy 4.1.1 offers some modest to moderate reductions to fuel consumption at the Seattle campus central utility plant, much larger changes in GHG-intensive fuel consumption can be achieved with capital-intensive projects that would function as part of a long-term strategy. In some of the strategies, system efficiency considerations might suggest that the UW build a combined heat and power plant large enough to generate all of the campus' electric needs, perhaps making the UW a net exporter of electricity, heat or both. Candidate projects include:



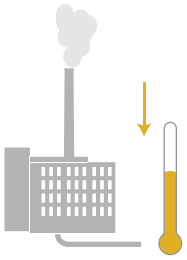
switch to renewable fuels

- Switching to renewable energy. An example of this would be replacing the natural gas fired boilers with electric boilers contractually coupled to a new source of renewable electricity. Alternatively, the natural gas could be replaced with a liquid or gaseous fuel produced from renewable resources (*i.e.*, bio-fuel), though this solution requires a cautious evaluation of the true life-cycle GHG savings of the bio-fuel.



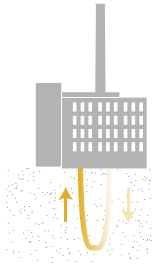
capture and store carbon

- Carbon capture and storage. This approach involves separating CO_2 from the central utility plant's exhaust stream and injecting it in a geological reservoir for permanent storage or (less likely) converting it to a solid form such as calcium carbonate.



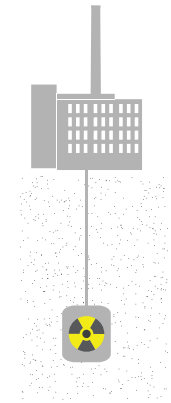
convert from steam to hot water

- Conversion of central heating system from steam to hot water. The central plant currently produces high pressure, high temperature steam for distribution to the campus. This approach allows more energy to be delivered per pound of water, thereby reducing the size of piping needed in the steam distribution system. However, the higher temperature steam results in higher thermal losses in the distribution system, and reduces opportunities for low-level heat recovery. A potential solution would be to convert the central plant to a hot water heating system, or install regional hot water heating systems throughout campus.



geothermal heat pump

- Geothermal heat pumps. The need to combust fuel could be greatly reduced or eliminated by installing closed-loop heat pump technology to extract heating energy from the ground; this would work particularly well in conjunction with conversion to a hot water system as described above.



other emergent technologies

- Other emergent technologies. New GHG neutral technologies are being developed and commercialized which may have future application at the central utility plant. One such technology under commercial development is a small-scale nuclear battery reactor design, which has its core buried and encased deep underground. Other technologies with possible application for the central utility plant could emerge in future years.

At the Tacoma campus, centralized heating serves the eastern half of the campus. The development and extension of a central plant that would service future growth in the western half of the campus and, perhaps, tie into existing facilities is a preferred option. The size and high growth potential of UW Tacoma makes it an excellent candidate for testing new technology and tracking its effectiveness. UW Tacoma's 2008 Infrastructure Master Plan proposes that such an expansion to the central utility be deployed using geothermal technology.

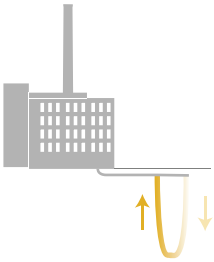
*4.1.5 **Strategy:** Site-specific energy resources*

For each building, on each campus, there may be solar, wind or geothermal resources that can contribute to the facility's energy mix. Opportunities that should be evaluated under this strategy include:

solar panels

wind turbines

landfill methane



deep lake chilling

- Solar thermal or solar photovoltaic opportunities exist on all of the UW campuses, with the opportunity varying from building to building depending on architecture and site geography. The integrated design techniques that will be used for new projects (Section 4.2.2) will enable these technologies more fully.
- Wind resources are extremely limited on the three UW campuses, but the UW could, in principle, develop its own wind plant at a remote site, in collaboration with local utilities for management and for electric transmission.
- A portion of the Seattle campus is located on the old Montlake Landfill, which was closed in 1966. It continues to generate methane, a potent greenhouse gas. It may be possible to combust this methane for supplemental energy generation, though there is significant doubt that the quantity is sufficient. If combustion is possible, since the methane is currently released to the atmosphere and the combustion product would be a much lower-potency greenhouse gas (carbon dioxide), this action could result in *negative* GHG emissions.
- The Seattle campus is located adjacent to Lake Washington—a large, deep lake. The campus could potentially be cooled with an open-loop geothermal system in which cold water is pumped from the depths of the lake, used to cool campus buildings in place of mechanical chillers and then returned to the lake. Evaluating this action would require a thorough and costly environmental assessment, but initial indications are that the very small increase in temperature might, if anything, be beneficial to fish migration.

4.2 Campus Energy Demand

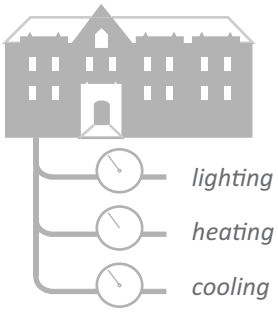
demand-side

This category covers the strategies for reducing energy demand by current and future University of Washington buildings and the equipment within them. Buildings and equipment dedicated to information technology are treated separately in Section 4.3.

Buildings can be designed, built or renovated to use far less operational energy per square foot, while maintaining high quality, health and comfort. While there are usually additional initial costs, energy efficient buildings cost less over the life of the building, reduce the total cost of ownership, reduce energy and operational costs and significantly reduce GHG emissions.

But in addition to the new (and old) technologies realized with efficient building design, reducing campus energy demand is equally a behavioral measure, requiring development of new policies, well-organized implementation, incentives and building occupant training.

*4.2.1 **Strategy:** Require High Performance Building Standards*



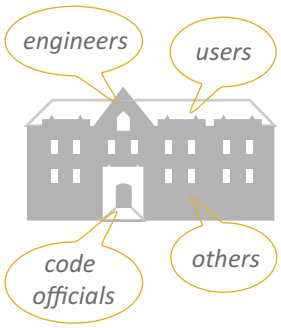
building performance

UW buildings are currently built to either local jurisdiction standards or the Washington State Energy Code, which while more stringent than some energy codes, does not currently invoke the reductions in energy necessary to stabilize the climate. For state-funded buildings, the UW is also required to design, construct and operate to the LEED Silver level. For self-funded or private/public partnerships the UW has unofficially adopted a LEED standard for all new buildings and major renovations. LEED is not itself an energy efficiency standard, though it does include metrics for achieving energy use reduction in buildings, and much more can be achieved in reducing energy demands of new and renovated buildings.

This strategy consists of adopting a quantitative, energy-focused design goal for UW's new construction and major renovations. If feasible, the goal should be based on an existing program external to the UW such as the Architecture 2030 Challenge, the Living Building Challenge or the Commercial Buildings Initiative.

- The Architecture 2030 Challenge requires new buildings to use 50% less energy than a similar building in a similar climate through 2010; after 2010 new buildings are required to be built to achieve an additional 10% reduction in energy use every 5 years, until new buildings are GHG neutral, as of 2030.
- The Living Building Challenge is stewarded by the Cascadia Region Green Building Council and is intended specifically as an extension of LEED. It requires buildings to generate all energy from onsite, renewable resources on a net annual basis, but it does not establish a progressive timeline for achieving the design standard.
- The Commercial Buildings Initiative was launched in the Energy Independence and Security Act of 2007, and sets goals for the penetration of net zero energy buildings (NZEBs) into the U.S. buildings stock, such that all new construction is NZEB by 2030, half of the gross stock is NZEB by 2040 and all commercial buildings are NZEB by 2050.

Proposed Actions: Select and require high performance energy efficiency requirements for all capital projects, and establish a timeline for penetration of the standard throughout the UW campus.



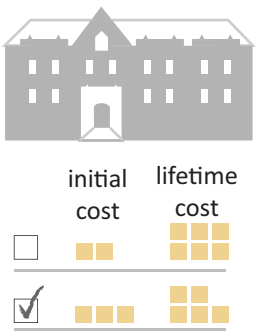
integrated design

*4.2.2 **Strategy:** Optimize Building Energy Efficiency with Integrated Design*

Although current UW standard project delivery processes foster some multidisciplinary building design integration, more extensive collaboration, especially earlier in the process, is needed to achieve further energy efficiency goals. An integrated process, or "whole building" design process, includes the active and continuing participation of users, code officials, building technologists, cost consultants, civil engineers, mechanical and electrical engineers, structural engineers, specifications specialists and consultants from many specialized fields. The best buildings result from active, consistent, organized collaboration among all players.

Integrated design teams are able to apply a broad array of techniques supporting energy efficiency, among them established energy reduction design practices (Section 4.2.4), the use of on-site renewable energy (4.1.5), energy use monitoring (4.1.3) and launching effective operating procedures (7.4).

Proposed Actions: Implement a formal, integrated design process as the standard for all Capital Projects Office and Facilities Services capital projects. Update language in design contracts, including cash flow expectations, to better support the collaborative needs of integrated design.



Energy Efficiency Decisions

*4.2.3 **Strategy:** Make Informed Energy Efficiency Decisions*

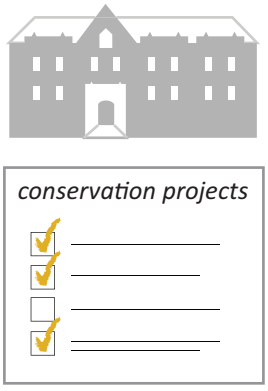
Two tools available for making more informed energy efficiency decisions are life cycle cost analysis (LCCA) and energy modeling. Using either tool well implies energy planning over the expected life of the building, with capital budgets and operational budgets considered simultaneously.

LCCA is used to evaluate the lifetime cost of ownership, and identify the best actions. Inputs to the analysis for a given action are total capital cost, anticipated life of the relevant systems, total operational costs including utilities and staff, total maintenance costs and total replacement costs. With this information LCCA permits campus planners to identify payback and return on investment

(ROI) for building systems. Like integrated design, LCCA benefits from systems thinking in which changes to one system may reduce demands on another. For example, insulation added to the building envelope means mechanical systems can be smaller. Thus, LCCA is best applied to bundled systems to maximize synergy.

Currently, the State of Washington only requires an LCCA of building energy systems for state-funded projects over 25,000 square feet. Energy modeling of buildings complements LCCA by identifying the most energy efficient building systems during the design phase. Modeling allows for optimizing and integrating systems like building orientation, window size and location, building envelope characteristics, heating and cooling systems and provides the most comprehensive and accurate possible set of inputs for LCCA.

Proposed Actions: Implement LCCA policy for all large building projects. Identify appropriate energy modeling methodologies for all large capital projects, and encode in policy.



*4.2.4 **Strategy:** Increase Energy Conservation Projects*

Of all the campus buildings we expect to be in use in 2050, over 70% already exist. A comprehensive plan is needed to significantly expand energy conservation in existing buildings. Strategy 4.1.3, Measure and Monitor Building Performance, provides the energy monitoring and auditing capability that is a prerequisite to identifying the most efficacious conservation opportunities. Beginning July 2010, building energy usage for each reporting public facility at the University must be entered into the U.S. EPA's Energy Star Target Finder tool; buildings not meeting state expectations will be targeted for energy audits followed by energy LCCA to identify the most desirable improvements to building performance.

Past conservation projects have focused primarily on efficient lighting and mechanical system upgrades; we expect that an increased level of attention to conservation will result in a shift of focus, perhaps with building envelope renovation projects coming to the fore. Building envelope projects focus on reducing winter heat loss by improving thermal barriers, and they do not always need to require an entire building renovation. Laboratories are the most energy intensive type of building on campus and should likewise be a high first target for conservation projects. The 2008 Tacoma campus Infrastructure Master Plan already

identifies a host of potential conservation projects, and it could serve as an inspiration for the other two campuses.

The University owns seven downtown Seattle buildings on the former site of its original campus, the "Metropolitan Tract," that are included in our GHG inventory. The buildings serve no academic function, but are leased and managed by Unico Properties. The University will work cooperatively with Unico to implement many of the innovations deployed on campus to these buildings.

Because conservation projects reduce energy costs, some may qualify for utility rebate funding, adding an extra financial incentive.

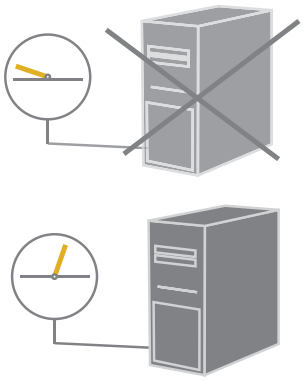
Proposed Actions: Review the current system for identifying, prioritizing and funding energy conservation projects to identify obstacles for effective expansion. Improve metering to identify opportunities and monitor progress. Add incentives that apply some of the funds saved by energy reductions to expanded personnel, training and equipment that support further energy reductions.

4.3 Information Technology

information technology

According to the U.S. EPA's August, 2007 Report to Congress on server and data center efficiency, power-hungry data centers in the U.S. consume the annual output of 15 average-sized power plants. However, data centers represent only a fraction of the total energy consumption from information processing. For every server in the UW's data center, there can be 10 times as many departmental and rack servers distributed across the campus, and there can be from 50 to over 250 end-user computers. On any given day, more than 95,000 computing devices are connected to the UW network. The average active, powered-on desktop computer consumes 100 to 300 watts of electricity. Much of the electricity that comes through the power cord of the computer is turned into heat and power conversion waste through the power supply.

Thus, the problem is actually greater than the growth in power consumption by the data center itself. Green computing initiatives at the UW can be divided into those that affect the central data center and those that affect computing at a distributed level, campus-wide.

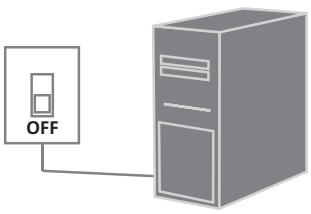


more efficient equipment

4.3.1 ***Strategy:*** *Buy Green*

The environmental impact of computing equipment is primarily (though not only) associated with its energy consumption during use. Hence, purchasing policies for computing equipment should include the costs and implications for energy use as important criteria. In some cases, favoring particular technologies can have a significant impact. Laptop computers are more efficient than desktops, and when purchased with docking stations offer the same look and feel as the desktop PC. Flat LCD screens consume less power than CRTs, and reduce the lead and mercury contamination associated with discarded CRT monitors. Within each technology, the U.S. EPA's Energy Star rating offers a simple and meaningful distinction to equipment that meets reasonable energy efficiency standards. In addition to the Energy Star rating, many manufacturers have obtained EPEAT (Electronic Product Environmental Assessment Tool) registration for their products by adopting a set of green manufacturing standards. By including an EPEAT Gold registration as a prerequisite for purchasing, the University could ensure that clean manufacturing standards have been followed for the equipment purchased.

Proposed Actions: Explore costs and benefits of adopting a UW policy that meets faculty and staff research, teaching and administrative needs for purchasing computer hardware that reduces energy use. Where possible, require the Energy Star rating and EPEAT Gold registration goal for all computes, including workstation quality laptop computers, docking stations, standard monitors and standard keyboards. Replace CRT monitors with LCD monitors and configure systems with aggressive power management or install power saving software to accomplish the same goal.



equipment turned off when not in use

4.3.2 ***Strategy:*** *Exercise Power Management*

Power management technology enables systems to automatically turn off components, such as monitors and hard drives, after set periods of inactivity. In addition, a system may hibernate, turning off nearly all components and greatly reducing the system's electricity usage.

Ideally, when a computer is not needed by its owner, it should either be in a low power state or doing research calculations by participating in distributed computing for the benefit of science, for example by installing and running the Ber-

keley Open Infrastructure for Network Computing (BOINC). Distributed computing for science introduces an energy efficiency dilemma that has not yet been resolved; setting future UW policy will require a deeper understanding of appropriate computing infrastructures and their energy demands.

Proposed Actions: Activate automatic sleep and hibernation on workstation computers. When patch/update procedures permit, shut down workstation computers at night if not running BOINC. Where possible, provide power strips that sense the power of a control device to automatically turn off all the related peripheral equipment when the control device is turned off. Provide economic incentives for departments to manage power via installing monitoring and reporting technology.

more efficient heat dissipation

*4.3.3 **Strategy:** Increase Data Center Efficiency*

As with workstation computing equipment, purchasing choices for data centers should be made with energy efficiency in mind, using the Energy Star rating and EPEAT registration as standards where applicable.

Data centers have large energy demands for ventilation and air conditioning, and careful attention to HVAC systems can reduce their demand on the campus energy system. In particular, installing an economizer that cools the data center with outside (rather than re-circulated) air or air-cooled water may result in significant energy savings. This equipment has already been installed in the University's primary data center. There may also be opportunities to recover and reuse waste energy, as is already done at the University's 4545 Building, but many of these opportunities are still unknown and require study.

Measurement and tracking of energy use by each piece of computing equipment can also enable adjustments for efficiency by directing more demand to the underutilized equipment, and obviating the need for other machines. In some cases, equipment can be adjusted to meet low demand. The collective energy consumption by all the computing equipment in a data center can be divided by the gross energy consumption of the data center to calculate power utilization effectiveness, "PUE," an important metric describing the data center's performance as a whole.

Proposed Actions: Examine the costs and benefits of replacing non-rated server equipment with Energy Star equipment. Conduct research projects to identify best practices. Install HVAC economizer equipment and controls. Study opportunities for waste energy recovery. Install building management and inventory control systems to monitor, track and trend energy use by all equipment and match demand accordingly.

reduce number of computers

4.3.4 ***Strategy:*** *Consolidation and Virtualization*

One option is to consolidate as much computing power as practical in data centers, rather than have them located in non-technical spaces. Data centers are special facilities designed to be secure, reliable and efficient locations to support the continuous operation of computer equipment. Data centers are designed to handle the cooling needs of computing equipment in the most efficient way possible and reduce HVAC demands on buildings designed for housing people rather than machines. Consolidation provides several other benefits as well, including reduction in energy costs, longer life for equipment (since it is in well-managed environmental conditions), removal of fire hazards from occupied buildings and increased opportunity for virtualization.

Virtualization is the practice of executing computing processes that normally require different pieces of equipment on a single piece of equipment, or enabling a computing process that normally requires a specific piece of equipment to operate on multiple pieces of equipment. Virtualization gives data center managers more ability to match demand and supply of computing resources, and hence the capacity to run much more efficient computing for the University than is possible with a distributed system.

Proposed Actions: Explore new computing technologies and develop appropriate approaches and policies given emerging opportunities. Collaborate with faculty and staff to migrate distributed computing resources to data centers where appropriate. Remove financial incentives for departments to place servers in locations that are not designed to support computer equipment. Expand capacity for virtualization.

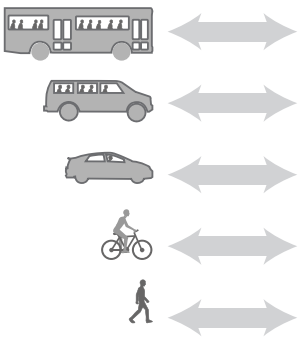
*4.3.5 **Strategy**: Utilize Cloud Computing*

In cloud computing, commodity IT services (*e.g.*, email, document processing), which are customarily provided at desktop computers or in local data centers, are delivered over the internet instead. Cloud computing offers the same benefits of virtualization described above, but on an even larger scale. Cloud computing vendors (in particular, Microsoft, Google and Amazon) have enormous economy of scale in their data centers, and have been pioneers in improving data center power efficiency.

Enabled by advances in Internet technology and deployment, commodity IT services are now widely available as network-accessible web services, as are IT infrastructure components such as storage and compute clusters. Although this marketplace is young, and pricing varies from "free" to "high," the expectation is that high-scale providers using power-optimized data center designs and best-possible power contracts will inevitably be able to offer savings over servers provisioned locally in high-cost real estate, with no tax or power cost advantages.

There will continue to be growing pressure on local data center resources; therefore, we can and should take advantage of these new cloud opportunities to both reduce overall GHG footprint and save precious local datacenter resources for those systems that must remain local.

Proposed Actions: Aggressively explore opportunities for using cloud services rather than servers provisioned locally in our own data centers when the cloud services are compatible with the university's functionality, policy and cost objectives. This would include applications such as email and other collaboration tools, as well as "infrastructure as a service."



commuting

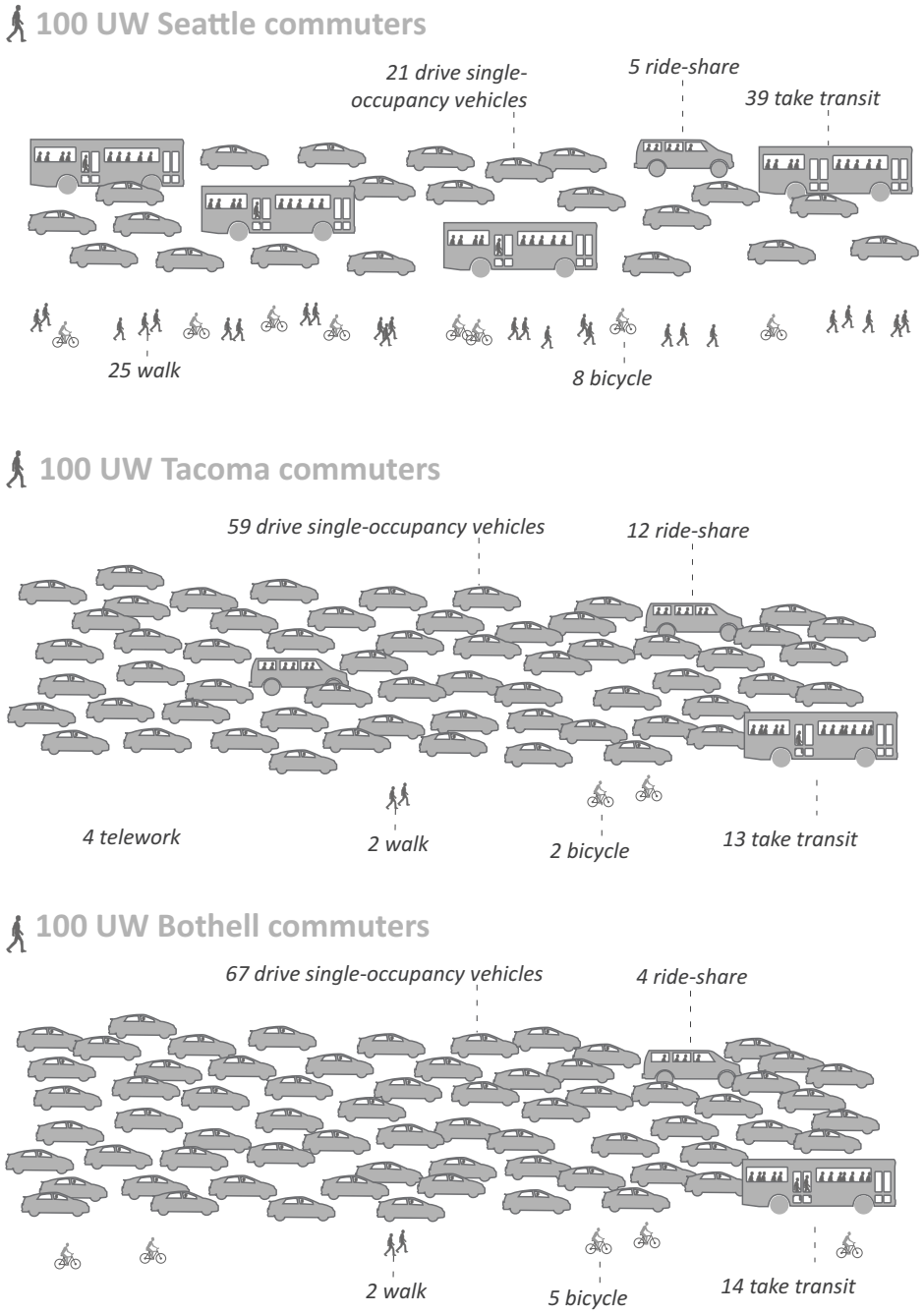
4.4 Commuting

The University of Washington's three urban campuses, with plentiful transportation options, are well situated to minimize drive-alone commuting.

At the Seattle campus, decades of transportation management mean only 21% of commute trips are drive-alone: the easily achievable changes in behavior have already been accomplished. The challenge ahead will be to increase the use of non-motorized transportation and reduce the emissions from motorized trans-

portation, including transit. Both the Bothell and the Seattle campus are served by the Burke-Gilman Trail, a bicycle artery for the greater Seattle area.

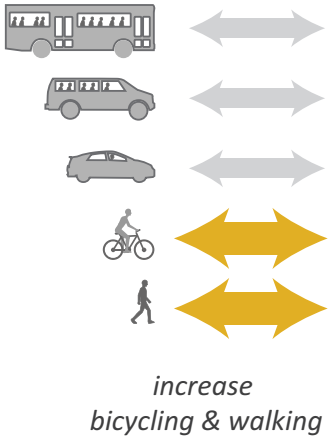
Figure 9 – Commuting profiles by campus



At the University of Washington Tacoma, effective transportation demand strategies have been in place for a short time, and progress has already been made. Since 2006, the drive-alone rate for employees has been reduced by 18%.

Commute trip reduction has been expanded to students for the first time this academic year and a Student Transportation Coordinator was hired for this work. Figure 6 dramatizes the payoff the UW has gained at the Seattle campus from its long history of commuting management and the gains still to be made at the Tacoma and Bothell campuses.

Students, faculty and staff using public transit to commute to UW campuses are often using the more densely populated, urban bus routes, so that their per-passenger emissions are likely lower than the bus system average used to calculate the UW Inventory. In the future, commuting strategies and actions could be refined to maximize GHG impact by using an improved inventory process that accounts for the passenger densities of the buses used by University commuters.



*4.4.1 **Strategy:** Support Bicycling and Walking*

Walking and bicycling are GHG-free transportation options. Currently, about a third of the Seattle campus population walks or bikes to campus, with around 4,300 cyclists and 13,500 walkers per day. Almost 60% of the Seattle campus population lives within five miles of campus, and today there are many people that bicycle or walk occasionally, but do not make those options their primary commute choices.

Figure 10 - Proximity to campus

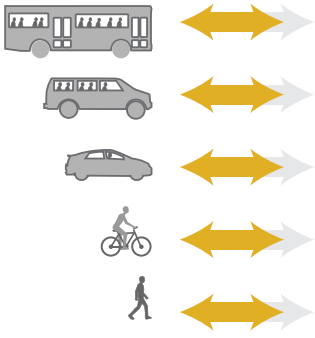
A secure and dry place to store one's bicycle is one of the key needs of cyclists. Today, the roughly 600 bicycle lockers on the Seattle campus supply less than half of the demand for secure parking. The provision of secure parking and improved campus safety is a key factor within the University's direct control; providing enough supply to meet demand will eliminate a significant barrier to bicycle commuting.

Other strategies to support bicycling and walking include building design policies to provide bicycle-friendly infrastructure, showers and clothes locker facilities. Beyond the optimization of on-campus facilities, partnerships and investments are needed to improve pedestrian and bicycle infrastructure in the neighborhoods surrounding the campus. Incentives can also be provided to students, staff and faculty such as offering a membership club for walkers and bikers with commuter benefits. Finally, education campaigns can be conducted to help the University community understand how to walk and bicycle safely and look out for the safety of walkers and bicyclists when using other transportation modes.

At UW Bothell, the Burke-Gilman Trail and the Sammamish River Trail both provide regional connections for bicyclists and pedestrians, but additional infrastructure is needed to support bicycling and walking, including additional showers and lockers in new buildings, additional bicycle racks at new building entrances and secure bicycle areas in parking garages.

Infrastructure and programs to support bicycling and walking are needed at the Tacoma campus. There are currently no covered bike shelters, though the first may be installed by this summer. Showers and clothes lockers are scattered across the campus but are not well known.

Proposed Actions: Construct sufficient secure bicycle parking spaces to meet demand, and improve campus safety generally. Explore options and adopt policies for building and campus design that support walking and bicycling.



decrease commute distance

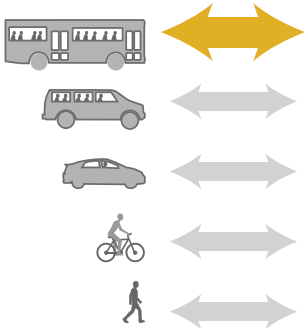
*4.4.2 **Strategy:** Increase Student, Faculty, and Staff Housing near Campus*

Much can be done to encourage bicycling and walking by people who already live near campus. However, to have a large and lasting shift towards reducing commuting emissions, more students, staff and faculty must live within walking and bicycling distance of campus.

UW Bothell is working to provide student, faculty and staff housing in close proximity to campus. At the Seattle campus, planning for the addition of a substantial amount of student housing is well on its way. Looking longer-term, strategies should be developed to encourage staff and faculty to live near campus. Staff and faculty tend to live farther from campus, as they have differing housing needs. Affordability, high quality schooling and day care and the perception of

safety and quality of life in the neighborhoods surrounding the University are all important factors in increasing the number of staff, faculty and students living near the University.

Proposed Actions: Explore how to attract faculty and staff to live near campus and advance the construction of new student residence halls that are energy efficient.

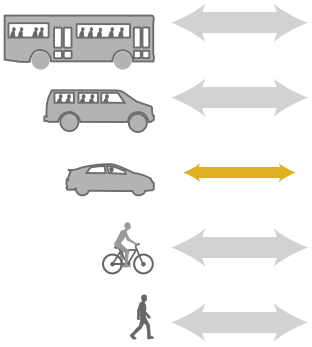


encourage transit

*4.4.3 **Strategy:** Maintain Low-Cost Transit Access*

The University of Washington has enjoyed great success, particularly at the Seattle campus, in shifting commute trips from private vehicles to public transit. However, due to increasing costs and declining funding from sources other than user fees, an unprecedented increase in the U-PASS fee was required in 2009 to keep the program in existence. Rising costs may reverse past gains. Maintaining current commuting practices and GHG performance will be jeopardized if U-PASS costs continue to rise.

Proposed Action: Develop and implement a new funding model for the U-PASS program that leverages its wide-ranging benefits to the University and the region, and keeps user fees low.

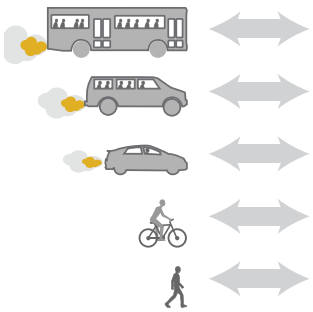


discourage driving alone

*4.4.4 **Strategy:** Reduce Vehicle Parking on Campus*

Increasing the cost of vehicle parking and limiting the supply of parking are fundamental strategies of transportation demand management. This strategy has been used extensively at the Seattle campus and the potential for further gains needs to be explored. The strategy is underutilized at the Bothell and Tacoma campuses. Free and inexpensive parking that is readily available to the campus community undermine the University's commute trip reduction efforts. The cost of single occupant vehicle parking should be increased and preferential parking should be offered to carpoolers and vanpoolers. At all campuses, strategies can be pursued that would increase awareness of the total cost of parking.

Proposed Actions: Explore the impact of increasing the cost of parking and identify improved opportunities for other commute options.

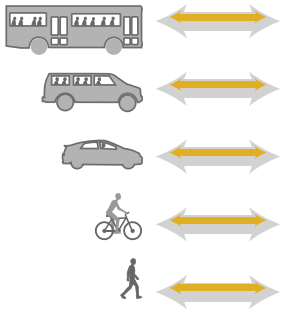


decrease emissions of vehicles

*4.4.5 **Strategy:** Increase Vehicle Fuel-Efficiency*

There will always be some portion of the campus population that commutes using motorized transportation. Promoting transit and ridesharing over single-occupant vehicle travel will help reduce emissions. For example, UW Bothell is making progress in increasing carpool permits and U-PASS sales. However, on the Seattle campus many of the gains from this strategy have already been achieved. The next step is to reduce the emissions from the vehicles themselves. The University could provide incentives to employees to purchase zero- or low-emissions vehicles and help employees access incentives offered by the federal government and others. The University could also work with local transit providers to support their efforts to reduce transit vehicle emissions.

Proposed Actions: Research and identify low- and zero-emission vehicle purchase incentives from outside sources and consider developing a program to promote them on campus. Increase the level of investment the University is willing to make to reduce vehicle emissions by greening the commute fleet, including public transit.

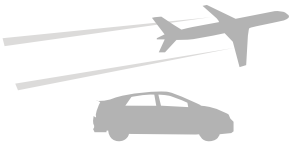


reduce number of trips

*4.4.6 **Strategy:** Encourage Telework and Distance Education*

The emissions from any potential commute trip can be avoided if the work can be completed without the need to make the trip. Telework and distance education offer options to reduce commute emissions and do not depend on a short commute distance. Increasing the use of telework and distance education requires improved infrastructure, development and adoption of policies and changes in institutional culture. Increases in telework will need to be carefully considered in light of the academic and teaching missions. In addition, it is important to include community building in all telework and distance education initiatives to ensure that students, staff and faculty feel connected to and invested in the University.

Proposed Actions: Develop a comprehensive University-wide effort to provide staff, faculty and students with the tools, resources and knowledge needed to maximize the use of telework and distance education.



professional travel

4.5 Professional Travel

Professional travel is associated with administrative business, scholarly research, conferences, visitors and speakers, intercollegiate athletics and recruitment of graduate students, faculty and staff. UW faculty, students and staff travel using a combination of modes, with the vast bulk of emissions arising from retail air tickets and a smaller portion associated with rented and UW fleet road vehicles. Hence, the Professional Travel category includes a combination of Scope 3 and Scope 1 emissions. Travel that occurs at an individual's personal expense (*e.g.*, trips to and from Seattle by students living in other states) is not included.

Figure 11 - Air travel expenditures

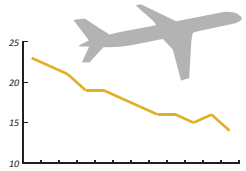
Air travel expenditures at UW increased 37% over the past three years from $18.7 million in 2005 to $25.6 million in 2008. While these costs are accurately known, the miles and associated emissions are much less certain. This is because air-travel miles are not directly monitored at UW. Instead, air-travel miles are estimated from expenditures using a constant conversion factor ($0.25/mile). Whether this conversion factor applies to the mix of air-travel costs actually incurred at UW is unknown. Moreover, the true conversion factor undoubtedly varies from year-to-year such that using a constant value could either hide or exaggerate trends in emissions.

Unlike ground transportation, significant GHG reductions from changes to aircraft technology are unlikely in the immediate future. In the long term, there is potential for fueling aircraft with low-GHG bio-fuels or deploying high-speed rail powered by renewable electricity. While the UW has little influence on the fuel efficiency of aircraft, it can participate in research and take action to affect behavior, for example, reducing miles traveled.

Air travel plays a vital role in UW's mission to be a global university and in the culture of academia. UW scholars conduct research around the world and gather regularly at conferences where ideas are exchanged and collaborations are formed. The face-to-face interactions at such conferences, including informal discussions in hallways and at meals, can be crucial to professional success.

Many of these functions would be difficult or impossible to achieve with video-conferencing – the most viable alternative to air travel. Nevertheless, videoconferencing is already being used at UW to replace some of the functions of long-distance travel and, as the technology improves and cultural practices evolve to make use of them, it is reasonable to expect that it will become a strong substitute for travel. This transition carries benefits beyond the reduction of GHG emissions. For example, videoconferencing is more flexible than air travel in many respects: It facilitates participation by larger numbers of people, and it is far less expensive in terms of both dollars and time.

Given the above factors, the UW's overall strategy for reducing emissions from air travel is to work vigorously to develop videoconferencing while preserving access to air travel for the many functions that it alone can fulfill. Remaining air travel emissions might be mitigated by the purchase of GHG offsets.



improve monitoring

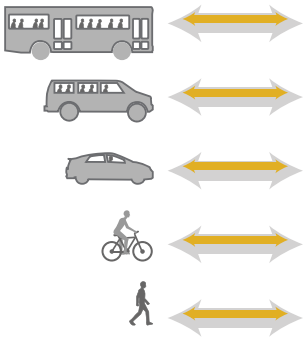
4.5.1 ***Strategy:*** *Improve Monitoring of Air Travel Emissions*

A program to reduce air travel emissions cannot proceed without accurate monitoring of year-to-year changes. The cost-based method currently used alternately exaggerates and hides real trends in air travel miles depending on fluctuations in airfare. Two improvements are possible.

One improvement is to obtain a more accurate, time-sensitive, cost-to-mileage conversion factor. For any given trip, the cost-per-passenger-mile can be obtained from the cost and destination information on the travel voucher. We propose that annual averages of this conversion factor be estimated by randomly sampling a small portion of UW travel vouchers from each year. (This work has already begun as a Summer 2009 research project by students in ENVIR 235, *Introduction to Environmental Economics*, taught by Dr. Yoram K. Bauman.)

A second step toward improving accuracy would be to record all air travel destinations in a central database with a coded system that allows automated calculation of trip length. Accurate estimates would require recording transfers (layovers) and final destinations. The cost of creating such a system needs to be explored vis-a-vis the benefits.

Proposed Actions: Sample and calculate cost-of-mileage annually. Enhance UW eTravel system to calculate travel mileage from the entry of coded destination information.



reduce number of trips

*4.5.2 **Strategy:** Develop Videoconferencing as an Attractive Alternative to Air Travel*

Videoconferencing represents an increasingly viable means of achieving many of the academic and organizational goals of long-distance travel, although it will never replace the need to conduct research on location or substitute for some in-person collaboration. Compared with air travel, it incurs almost no GHG emissions and is much cheaper. UW already has a small number of videoconferencing facilities that are being used in a variety of ways that both enhance education and reduce the need for long-distance travel. Examples are meetings that include members from all three campuses, guest lectures for UW classes, guest lectures delivered by UW faculty for other universities, classroom discussions with students or experts in other countries and Master's and Ph.D. exams where one committee member resides at another institution.

Expanding the use of videoconferencing to the point where it is a satisfactory substitute for air travel is a challenging goal and will evolve as technology improves. Classroom and conference-room facilities require capital investment and trained staff. Smaller scale approaches (*e.g.*, personal computers and webcams) are useful for many purposes, but still require appropriate hardware, software, training and support. There is a need for standardized communication protocols, and appropriate cultural norms need to be developed as well. We envision UW students, staff and faculty playing leadership roles in meeting these challenges. Indeed, these challenges speak to several elements of the UW's vision statement aspiring toward a global reach for UW (see Section 1.2).

Proposed Actions: Promote the improvement and expanded use of videoconferencing facilities at UW. Work with peers and associations to develop standardized videoconferencing protocols. Consider hosting an all-remote conference as a way for UW to help make videoconferencing a normal and accepted academic and administrative practice.

4.5.3 ***Strategy:*** *Favor Alternate-Fuel Vehicles in UW Fleet Services*

encourage use of efficient UW vehicles

UW Fleet Services has an automated UCAR car share program that provides the UW community various models of alternative fuel fleet vehicles at several locations throughout the campuses. University employees and students are able to rent, pick up and drop off Fleet Services vehicles 24/7 via an online web reservation and automated key manager system.

In 2008, UW employees travelled close to three million miles in employee-owned vehicles while on University business. Promoting use of Fleet vehicles in lieu of personal vehicles will ensure that vehicles used to conduct University business meet emission reduction goals. Accelerating long-term changes in employee driving behavior will also require changes in UW policies and practices with regard to personal mileage reporting and reimbursements. One possibility is to cap the reimbursement for personal vehicle use at a UCAR-equivalent rate so that personal vehicle use is only financially commensurate when the vehicle is at least as energy-efficient as a UCAR.

Proposed Actions: Complete greening of UW vehicle fleet. Develop appropriate caps on personal mileage reimbursement rates. Replace program- or department-owned vehicles with UCAR participation where possible.

5 Looking Beyond the Inventory

The strategies in this Climate Action Plan for reducing campus emissions (Chapter 4) are crafted around the concrete and limited exercise of reducing the UW GHG inventory. At the same time, the Plan makes an effort to embrace climate action on a holistic level by considering our academic efforts equally important to the straightforward GHG mitigation. In that spirit, the UW should strive to endorse behaviors that reduce GHG emissions elsewhere in the state, U.S. or globally, even if those reductions are indirect and not formally reported in the Inventory.

Land use decisions have impacts on commuting (4.4), campus energy demand (4.2) and other factors affecting the inventory, but they also affect carbon sequestration and emissions of the potent greenhouse gas nitrous oxide. Food choices on campus have GHG repercussions all over the world. The stewardship

of products and waste streams can avoid significant GHG emissions induced by product manufacture and disposal.

campus ecology

5.1 Land Use

We strive to envision the whole campus landscape as an ecologically sustainable urban system that satisfies University functions while promoting healthy aquatic and terrestrial ecosystems. Landscape should be viewed as more than an aesthetic amenity. Understanding the campus ecology and the vulnerability of certain ecosystems relative to new construction will help UW design, build, restore, maintain and manage the built environment more knowledgeably and preserve and enhance our ecosystem services.

Leveraging the stewardship of campus ecology to create synergies between the built environment and academic research and teaching will optimize the conditions for education and learning over time. The hands-on knowledge and understanding that would be gained, if fully integrated into our academic programs, can be expanded to regional and global scales.

Finally, land use and real estate decisions for all University locations should consider business travel and commute patterns with the intent of minimizing transportation since this is one of the largest sectors of climate impact. One potential tool for doing this is to assign real estate market value to all land on the UW campuses, ensuring that the use "pays for" the value. In some cases, this could be interpreted literally; for example, the value of land allocated for parking purposes could be added to the cost of parking permits. Any land use decisions should be incorporated with the UW's master plan.

Proposed Actions: Create guidelines based on best practices that support a comprehensive understanding of sustainable land use planning. Determine how to best to include these guidelines in the decision making process for real estate and capital projects. Following a suitable period of pilot testing, translate guidelines in policies.

composting

5.2 Food and Composting

UW Food Services has already taken extraordinary steps to reduce waste and hence GHG emissions, beginning with a conscious choice to follow a retail busi-

ness model for residential dining facilities. Milk, eggs, bread and bakery, coffee, potato products, soups and the majority of Food Services' freshly packaged sandwiches, salads, sushi and other fresh packaged meals are produced locally. Food Services currently provides meatless alternatives to customers and will increase these options based on student demand.

Food Services has front-of-the-house and back-of-the-house composting programs to collect and transport all food waste, coffee grounds and other compostable waste to Cedar Grove Composting, a local facility at which these wastes are converted to compost and other products. All used cooking oils are picked up by a local company to be converted to clean-burning biodiesel, which is then sold to customers in the Puget Sound region. An operational logistics plan and associated agreements with vendors reduce the frequency of deliveries and other food service-related vehicle traffic on campus.

Proposed Actions: Continue to source more local and sustainable foods. Increase availability of compostable service ware for department-organized events. Increase coordination among Recycling, Solid Waste and Housing and Food Services offices to ensure appropriate receptacles and post-event pick up for functions catered by Housing and Food Services. Capture pre-consumer waste streams from large food preparation facilities at the UW Medical Center and Harborview Medical Center.

5.3 Reduce, Reuse, Recycle

reduce, reuse, recycle

Housing & Food Services (HFS) spends 27 percent of its total budget on local and organic foods, including cage-free eggs and hormone- and antibiotic-free beef and milk. Confinement-free beef and sustainably harvested seafood are also purchased. Fair trade coffee, chocolate and beverages are available. HFS manages the composting program within its residence halls and dining facilities and includes compostable dishware.

The U.S. EPA has demonstrated that significant GHG benefits accrue from increasing recycling rates; recycling simultaneously avoids landfill methane and avoids additional GHG emissions associated with extraction and processing of new raw materials. UW Recycling & Solid Waste manages the campus-wide organics recycling program, which includes composting of landscape waste, wood debris, and food waste. Recycling efforts on the Seattle campus also include an

extensive fiber recycling program (paper, cardboard); mixed containers recycling program (cans & bottles, tubs/jars/jugs, single-stream); construction and demolition recycling (construction debris, concrete, and asphalt); and special waste recycling (electronics, florescent lighting, electronic media). The Seattle campus diverted more than 54 percent of its waste steam from landfill from July 1, 2008, to June 30, 2009, with a goal to divert 60% by 2012.

Ideally, recycling waste items would be easier and more expedient than discarding them as garbage; as a minimum standard, recycling should be no more difficult than disposing of items as garbage. Perhaps the most significant factor in achieving this standard is the immediate availability of recycling receptacles and relative scarcity of garbage receptacles. It is the UW's position that no garbage receptacle should be placed without a visually adjacent receptacle for recyclables.

UW is also attempting to increase awareness of the waste that is thrown away, often without a second thought, in small desk-side containers. Reassigning the collection of the desk-side bins from custodial staff to the "owner" of each bin would provide a direct incentive to minimize desk-side waste disposal and favor recycling or waste reduction.

The UW also engages the reuse approach. The UW's surplus property program has been very successful in diverting large amounts of electronics, furniture, vehicles, equipment and other items from the University waste stream. In fiscal year 2007, more than 400 tons of goods were diverted through surplus sales, with revenues fully funding the surplus program and returning dollars to University departments when high-value items were sold. Items resold for use on-campus have the added benefit of reducing the UW's climate impact on both the disposal and purchasing fronts. Continued growth in throughput for the UW's surplus store and auctions has the potential to further expand diversion through reuse both on and off-campus.

Proposed Actions: Migrate desk-side waste collection to self-service disposal. Expand break room/office/kitchen recycling programs. Replace stand-alone waste bins with recycling bin-sets in common areas, classrooms and conference rooms as appropriate to the space. Increase visibility and density of recycling bins at athletic events. Expand reuse services for low-value high volume items like office supplies, including virtual storefront and delivery services to parallel e-

procurement. Expand reuse marketing to the non-profit sector and small businesses.

6 Strategies for Financing the Climate Action Plan

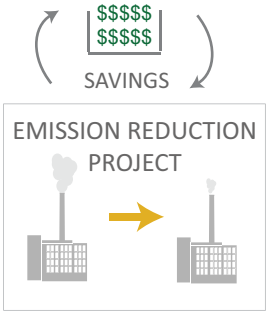
6.1 Funding Mechanisms

Funding is a core challenge of realizing the Climate Action Plan goals, especially in today's financial climate. Fortunately, many GHG reduction strategies will pay back the investment costs over time. New funding and tracking mechanisms are needed to verify cost savings and recycle a portion of those savings into further initiatives and projects.

The institutional culture to evaluate, fund and verify the costs and GHG reductions of strategies recommended in the Climate Action Plan is only partially in place. Achieving the Climate Action Plan goals will require operational and accounting changes that ripple through all departments. New organizational relationships are necessary that allow for more effective collaboration and integration across traditional organizational boundaries. Extensive and robust processes that measure total life cycle costs and GHG impacts are needed to guide decision makers.

Possible Climate Action Plan funding strategies are discussed below. Not every funding strategy is appropriate for every academic or emissions reduction strategy. In practice, the academic and reduction strategies need to be carefully coupled with each other in a way that is aligned with institutional goals and values.

*6.1.1 **Strategy:** Create a Revolving Climate Action Plan Loan Fund*

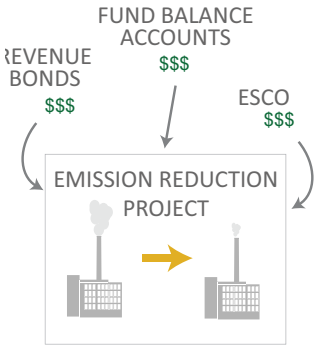


revolving loan fund

A revolving loan fund is an effective way to initiate and sustain key components of the Climate Action Plan. A successful revolving loan fund will require initial capitalization, strategic loans, effective cost tracking and verification to confirm projected cost saving and GHG reduction benefits are realized. The Loan Fund would provide capital for high performance, energy efficient campus design, operations, maintenance, and occupant behavior projects. Basic project eligibility guidelines would require reduction of the University's environmental impact and have a payback period of one to fifteen years.

The model is simple: The Loan Fund provides the up-front capital. Applicant units agree to repay the fund via savings achieved with project-related reductions in utility consumption, waste generation or operating costs. This formula allows units to upgrade the efficiency, comfort and functionality of their facilities without incurring any capital costs. By virtue of structuring the support in the form of loans, the fund will be replenished and thus exist in perpetuity.

Proposed Actions: Establish revolving loan fund and determine terms and expected payback criteria.



capitalizing climate action plan goals

*6.1.2 **Strategy:** Alternative Options for Capitalizing Climate Actions*

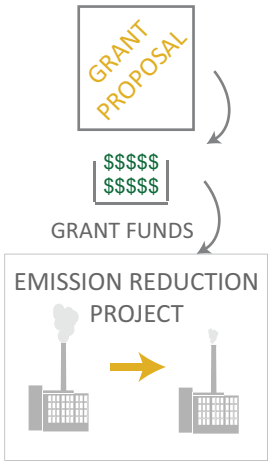
Climate Action Plan initiatives that demonstrate an appropriate rate of return based on lower utility costs over time could be capitalized with general revenue bonds or University fund balance accounts. Capital for energy reduction projects can also be provided through energy services companies (ESCO). The University has already accomplished many ESCO projects and has capitalized an energy reduction project at the 4545 Building (a leased property adjacent to the Seattle campus) by issuing general revenue bonds.

Proposed Actions: Review current ESCO and related programs to determine how to best expand and support these efforts. Establish more rigorous verification standards to support a higher level of investment.

*6.1.3 **Strategy:** Improve the UW's Utility Rebate Process*

The University has a long and successful history of working with local utilities on projects with quick payback periods and relatively simple engineering needs. However, accessing future rebates will require more sophisticated engineering analysis and a higher level of system integration. Restructuring internal roles and responsibilities of staff and improving the knowledge base is needed to maximize rebate opportunities.

Proposed Actions: Meet with utilities to explore expanded rebate programs.

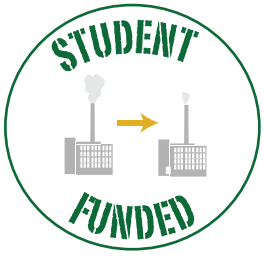


pursue grants

*6.1.4 **Strategy:** Pursue Grants that Reduce GHG Emissions in Building Projects*

At the UW, individuals pursue grant funding for their specific research with demonstrated success, but as an institution the UW has shown much less proclivity to pursue federal, state or other grants that fund sustainability or energy efficiency goals. An area of specific interest is grants for implementing Climate Action Plan goals associated with building projects. Pursuing grants that support building projects requires unique expertise and close coordination with between the Capital Projects office, Office of Research and OPB. Increasing our success with obtaining grants requires charging an office with coordinating responsibility.

Proposed Actions: Pursue grants that can contribute funds for reducing GHG emissions in building projects.



student green fee

*6.1.5 **Strategy:** Establish a Student Green Fee*

Many institutions have successfully implemented a student-funded green fee. These initiatives have generally come from students and initial conversations suggest significant student support. The Evergreen State College currently charges a $1.00/credit clean energy fee and Western Washington University assesses $0.70/credit-hour, to a maximum of $7.00. As an example, a $5.00/quarter fee assessed to each undergraduate and graduate student would generate about $700,000 annually to support Climate Action Plan initiatives. Student fees also create an effective mechanism to integrate students into the decision making process, raising the visibility and educational dimensions of the overall program. Students will need to organize this effort and gain approval through a student body election.

Proposed Action: Create process to establish a Student Green Fee

faculty and staff green fund

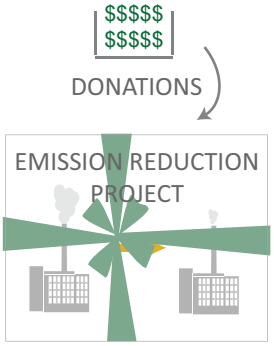
*6.1.6 **Strategy:** Establish a Faculty and Staff Green Fund*

When faculty and staff contribute directly to the goals of the Climate Action Plan, not only do they feel invested in helping the University achieve ambitious climate action goals, but they also gain a sense of parity and shared commitment, side-by-side with students. The success of this funding option will relate directly to how this group believes the funding is being utilized. A powerful way

to connect faculty and staff to the wider Climate Action Plan efforts is through Green Committees patterned after the University Health and Safety Committee or Diversity Council structure that would help identify options and drive behavior change in schools, colleges and administrative units.

Proposed Actions: Create an internal donations strategy and process to collect and distribute funds for UW projects; create a UW Green Advisory Committee.

*6.1.7 **Strategy:** Develop an Integrated Donations Strategy*



donations fund

Moving to a low-GHG economy is swiftly emerging as the defining issue of our time. Donors will want to support the UW's efforts especially if they see the institution taking a leadership role. Many donors will want to see how their contributions are helping educate students, faculty and staff in new ways of thinking and problem solving around the issue of climate change. We need to assess and address the opportunities and challenges associated with approaching donors for the Climate Action Plan initiatives when they may also want to direct their philanthropic dollars to other important University priorities. Involving University Advancement throughout this process is essential to ensure clear messaging and a comprehensive, integrated approach. Donations could be directed and distributed in numerous ways that should be explored (*e.g.*, through a 501(c) organization, an energy business or by donating to a line item associated with GHG reduction).

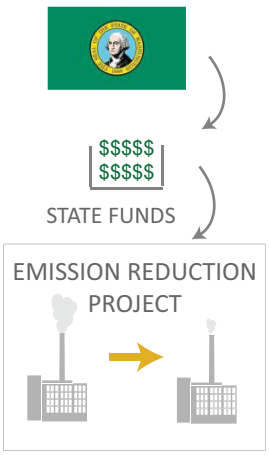
Proposed Action: Create plan to integrate academic, research and operational fundraising goals (including roles and decision making) and distribution of funds.

*6.1.8 **Strategy:** Improve Green Branding and Marketing*

green branding

A good marketing plan will be the foundation of many of the fund raising efforts. Being a leader in climate action planning and implementation has significant marketing and branding value that should not be overlooked. Money flows not just to good projects, but also to good projects that are visible and easily understood by the larger public. The UW already ranks at the top in comparison to our peer institutions on sustainability issues. Protecting the environment is a core value of the institution and continuing to build this reputation, supported by a good marketing program, is key to gaining the financial support for this effort.

Proposed Actions: Improve UW green marketing and branding efforts.



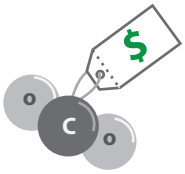
legislative opportunities

6.1.9 ***Strategy:*** *Pursue Short and Long-Term Legislative Opportunities*

Since GHG mitigation is a growing national and state priority, government funding of energy efficiency, alternative energy and other GHG-reducing programs is expected to grow. Improved internal coordination and presentation of UW as an exemplary leader among state agencies could result in increased University success in securing funding from the state. A long-term legislative plan will allow the University to take a more proactive role in the relationship we have with the federal and state government on this issue. A key legislative goal of the UW is gaining more flexibility from the state to shift funds from building operations budgets to capital budgets; the ability to increase project capital budgets through energy savings in operations is an important tool in achieving Climate Action Plan goals.

Proposed Actions: Discuss and identify state and federal legislative opportunities.

6.2 Participation in GHG Markets



carbon markets

6.2.1 ***Strategy:*** *A Cap-and-Trade Plan for UW*

The cap-and-trade mechanism developed for international, national and regional GHG reduction regimes could be deployed at a small scale within the University. A cap-and-trade system for an academic institution like the UW:

- Is innovative and cutting-edge;
- Allows the UW community to find the lowest-cost mitigation pathway in an organic way over time;
- Ensures direct involvement by all students, staff and faculty;
- Is itself an academically interesting project, with especially relevant angles for the Evans School and the Foster School of Business and the Economics department;
- Responds automatically to future GHG legislation at the federal and state levels through reduced allowance pricing; and

- Answers the Plan's financing needs with a single mechanism.

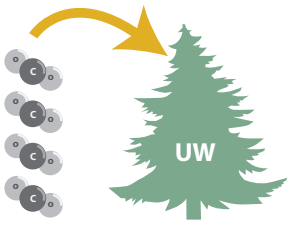
The University would need to set year-by-year allowance quantities based on the GHG targets described in Chapter 3, set rules for allowance banking and trading and determine a fair method for distributing those allowances each year. If all or some of the allowances are distributed through an auction, then the auction revenues can be deposited in a Climate Fund providing capital, research funds or other major expenses associated with implementing the Climate Action Plan; paying for the administration of the cap-and-trade system itself; or subsidizing the cost of allowances where justified.

Deciding exactly how UW units participate in the allowance market and from which budgets they are to pay for allowances will be a non-trivial exercise. This is especially true for allowances that cover emissions from building energy demand. A cap-and-trade system would also require increased precision in the UW Inventory so that each party's allowance needs are clear and accurate. Commuting would need to be closely monitored with an expanded, annual U-PASS survey; professional travel distances would need to be explicitly recorded for every trip; and campus energy demand would need to be sub-metered building-by-building.

Though the initial negotiation of a cap-and-trade system is daunting, the ultimate cost to the participating parties is surprisingly low. Take for example a particularly GHG-intensive UW commuter driving alone in a 20 mpg car, 20 miles round trip, and 250 days per year. At a typical allowance price of $20/metric ton, the price of emissions is only a little over $4 per month, or $50 per year.

Proposed Actions: Research, plan and articulate the cap and trade plan.

*6.2.2 **Strategy:** UW Internal Offset Generation and Sales*



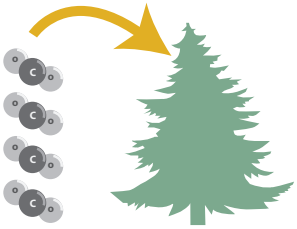
sequester carbon in UW forests

Land managed by the UW's School of Forest Resources can sequester carbon by maintaining forests in uncut habitat reserves or through the continuous production of wood products. The 4,300 acres Pack Forest and other forested lands owned by the University provide an opportunity for the University of Washington to measure and verify GHG offsets. The offsets can be retained by the University to offset its own inventory, or they can be sold to other parties to fund the Climate Action Plan.

The measurement of carbon sequestration and monetization of the associated GHG reduction are active research areas of the Center for Sustainable Forestry at Pack Forest. Preliminary research indicates that up to 142,000 metric tons of carbon could be sequestered in UW forests over the next 45 years if left unharvested. It is important to note that this estimate is based on a number of assumptions regarding growth rates, pickling rates, risk of forest fires and the carbon sequestration due to harvested wood displacing steel and/or concrete building materials. Many of these assumptions are topics of debate, so widely accepted forestry carbon accounting methodologies are still in development.

Current programs in the School of Forest Resources are funded through revenues generated by the sustainable management of these forests and will need to be considered carefully. Additional funds for the UW are generated from the management of 87,000 acres of trust lands in Washington state, most of them forested. Though these are under formal control of Washington's Department of Natural Resources, they can in principle be managed for carbon offset generation as well.

Proposed Action: Formulate a policy for internal offsets and allowances.



carbon offsets

*6.2.3 **Strategy:** Purchase of External Offsets or Allowances*

GHG offsets can be purchased to induce GHG reductions outside the University if the behavior and technological approaches described in the Plan are insufficient to make the UW GHG-neutral. It is imperative that only verified offsets submitted to a reputable GHG registry be used to meet the UW's mitigation goals. In lieu of offsets, the UW may wish to purchase and retire allowances issued by a regulated GHG regime such as the Regional Greenhouse Gas Initiative or the European Union Emission Trading Scheme. Retired allowances are a less controversial form of external emission reductions.

Proposed Action: Formulate a policy for purchase of external offsets or allowances.

7 Climate Policy Development and Implementation

This Climate Action Plan is a survey of ideas, most of which still need to be thoroughly researched for feasibility, and then realized as a prioritized series of ac-

tions. During the coming year we will nurture support from the academic, administrative and student communities and identify the most promising funding mechanisms (6). Priorities will need to be set, and reset, as new technologies emerge and the economy recovers. In this chapter we describe a flexible framework of guidelines for creating the priorities, policies and plans that will allow the Plan to unfold in a changing technological and economic environment.

7.1 Setting the Leadership and Decision Making Framework

Many of our strategies cannot be implemented without fostering collaboration among faculty, staff and students, and among offices, departments and units on all the three campuses. The President, Provost and Senior Vice President will need to proactively bring together the decision makers and participants needed to implement the Plan. Staff and faculty of the UW will need to be open to building the new relationships that result. Collaboration on research projects has tremendous potential and coordination and communication will be keys to success.

role for ESAC in implementing the plan

The Environmental Stewardship Advisory Committee (ESAC) has been the keystone of the UW's environmental stewardship efforts and is needed to move the Climate Action Plan forward. However, it is time to consider a new governance approach. One possible structure would have ESAC recommending policies and priorities and overseeing progress while a new Environmental Stewardship Leadership and Policy Committee, comprised of senior administrative and academic leaders (including the ESAC chair), would meet together to adopt policies, establish priorities and identify funding sources. Based on these decisions, Climate Action Teams that include faculty, staff and students would perform detailed planning and implementation. The UWESS office would have operational responsibilities including coordinating and communicating activities internally and externally; identifying where policies are needed and taking them forward to ESAC and the Leadership Team for consideration; monitoring, measuring and reporting operational and strategic progress; and managing the action teams. UWESS would also provide staff support to ESAC and the Leadership Team.

Proposed Action: Create and adopt a revised governance structure for ESAC, CAP implementation and UWESS office

7.2 Moving from Strategies to Actions

Each strategy in this Climate Action Plan is an abstract idea that can only be realized once a set of prioritized actions make it concrete. In each strategy section the concluding Proposed Actions offer an intuitive glimpse into what those actions might be, but the formal processes of identification followed by prioritization will occupy the coming year.

7.2.1 Identifying and Prioritizing the Actions

For each category of strategies, a small team of experienced staff and faculty with relevant experience will brainstorm possible actions relevant to each strategy in the category. The team will begin with actions already compiled in the process of creating the Climate Action Plan. Each action list will be sorted into "clear" and "obstructed" groups. All actions in the "clear" group will be subject to life-cycle cost analysis (LCCA) and also to an assessment of life-cycle GHG reduction. In this way, each action can be characterized by a single number representing cost-effectiveness in, say, metric tons reduced per dollar spent, allowing prioritization. Finally, the list prioritized by this quantitative metric will be adjusted by an appropriate team that unites the category experts with UW administrators who can place each action in the appropriate context of all University operations.

In the "obstructed" group, the same category experts plus a team of administrators will flag a subset of actions for feasibility studies and set a schedule for those studies.

Proposed Action: Prioritize actions based on level of difficulty, cost, GHG impact and other criteria to be determined

7.2.2 Reporting the Results

The final sets of prioritized actions will be reported in a new Climate Action Plan Implementation Document by September 2010. The Implementation Document will set out cost-effectiveness thresholds describing which actions in the "clear" group are to be pursued and will lay out a firm timeline for completing each action. Actions in the "obstructed" group flagged for further study will also be reported with a firm timeline for study and a draft timeline for implementation.

Proposed Actions: Develop CAP implementation plan and reporting document.

7.3 Climate Action Plan Administration

To coordinate CAP implementation; coordinate activities and participants from UW Seattle, Bothell and Tacoma; and support the governance structure, a well-established UWESS office will be needed. Regular communications, developing metrics and reporting tools and responding to the myriad of inquiries and requests is time intensive. Temporary financial support will be needed until the funding strategies are in place and decisions are made about ongoing funding for this effort.

Proposed Action: Create temporary and permanent funding model to support CAP implementation and UWESS office.

7.4 Making Climate Action the Everyday

In conjunction with the focused outreach efforts described in Section 2.3, climate action should be incorporated into the University's commonplace administrative procedures and daily habits, embedding it in the University culture.

7.4.1 Nurture Involvement

Engaging faculty, students and administration to work collaboratively creates partnerships where learning, research and administrative schedules overlap in new ways and allow each group's work to encourage the other to think about climate action when they might not otherwise. UW staff may need substantial support for implementing climate actions so the Plan provides a rich motivation for creating undergraduate internships and work-study opportunities that bridge the academic and administrative. UW faculty and staff in the position of mentoring those students will take ownership and pride in their work on environmental stewardship.

The UW as a laboratory for climate action

Recognizing the UW as a laboratory for climate actions that can be applied elsewhere (1.1) makes every UW employee a powerful climate action information conduit to their personal household, neighborhood, church, and so forth. On-campus collaboration will inspire off-collaboration.

Proposed Action: Create a faculty/staff/student collaboration plan to improve the UW's climate impact.

7.4.2 General Office Guidelines and Policy

The UW is committed to environmental stewardship in our offices, as well as in our business practices. The UW will guide office staff through a "pledge" and proactive communications in conscious and responsible use of heating and air conditioning, waste disposal and recycling, lighting, information technology, purchase of goods and services, printing and copying. Training and continued outreach to staff, faculty and student workers will be essential to increasing awareness, developing routine practices and eventually reducing the individual worker GHG footprint.

For staff and faculty, training and education in the wise use of resources can be delivered at the office and facility level using UWESS staff, Green Committees and Building Coordinators as a focal point for providing ongoing education in energy and water conservation and other sustainable practices. Creating UW-wide workshops and celebrations of special events like Earth Day will build awareness and a broader sense of ownership.

Proposed Action: Create guidelines and education/outreach program for faculty/staff/students.

7.4.3 Purchasing Policy

Procurement Services is committed to purchasing practices that promote the purchase and use of environmentally and socially responsible products, support reduced packaging, allow low-impact disposal and reduce or consolidate the delivery of goods to the UW. We particularly encourage the purchase of products that are made with post-consumer recycled content and/or bio-based products, are recyclable and are energy efficient.

In our commitment to support the purchase and use of such products, sustainability requirements will be included in all University-wide contract solicitations. We will also develop a proactive communication plan to educate individuals and departments in environmentally preferable purchasing practices when quality, performance and price are comparable to alternatives.

By including sustainability criteria in purchasing decisions we will not only put climate awareness into this everyday activity, but we will also be affecting GHGs in the manufacturing and waste disposal chains, making good on our claim to look beyond the inventory.

Proposed Action: Finalize purchasing guidelines and communicate them to UW community.

8 Tracking Progress

After the adoption of the Climate Action Plan and determination of the leadership framework to oversee implementation, progress will need to be tracked both for internal use and for ACUPCC every two years. The following items should be included:

- Engage Students, faculty and staff engagement with these efforts (research, teaching, internships, committee/group memberships);

- Lists of projects underway and their purpose;

- Operational metrics that will broadly cover areas of energy conservation and savings (including building submetering of water, electricity, steam and gas consumption on all three campuses);

- Additional GHG reporting on a source-by-source intensity basis, *e.g.*,
  - gross GHGs/square-foot (per campus)
  - gross GHGs/capita (per campus)
  - commuting mode-miles (per campus and other sites)
  - professional travel mode-miles
  - miles saved using video conferencing
  - carbon stored on all UW-owned land
  - passenger density on UW-serving bus routes (to improve accuracy of commuting emissions tracking)

- Qualitative metrics that will broadly cover opinions about UW's efforts and progress (surveys, anecdotal information);

- Metrics that show the progress in engaging our students and faculty in new and ongoing Climate Action Plan-related programs;

- Metrics that illustrate progress in interdisciplinary and shared administrative-academic projects;

- Metrics showing outreach to local businesses and technical organizations, especially those that offer opportunities and internships for our students;

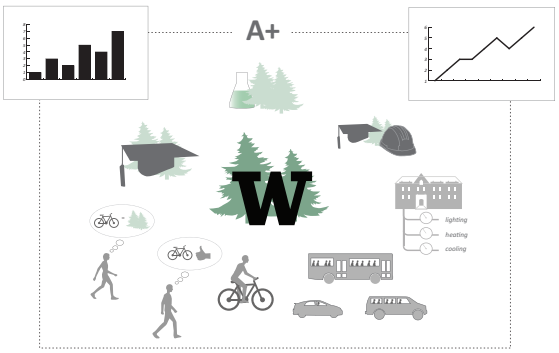
- Metrics that track annual institutional investments in new research opportunities for undergraduates and graduates on all three campuses;

- Awards and recognition gained by UW for its effort; and

- Financial tracking (funding identified, use of resources, impact).

We will create dashboard-format metrics to track and report CAP progress internally and externally.

The impacts of the Climate Action Plan on the UW will extend far beyond quantitative metrics. As the new College of the Environment integrates approaches to climate change across disciplines, and as ESAC and UWESS bring together the administrative and academic arms of the UW community, our united action around climate change will work to strengthen the UW not just as a center of excellence on climate research and mitigation, but as a university.



Acknowledgements

In January 2009, under the auspices of the UW Environmental Stewardship Advisory Committee (ESAC), a Climate Action Planning Oversight Team was formed to coordinate the drafting of a UW Climate Action Plan. This document is the first step toward achieving greenhouse gas emissions reduction targets by the University of Washington and its community, as required by the American College & University Presidents' Climate Commitment. UW President Mark Emmert is a charter signatory and leadership circle member.

The UW Climate Action Plan sets out broad strategies to be explored by the UW that will guide us toward the ambitious goal of becoming climate neutral and identifies the actions that can fulfill each of those strategies. This plan lays the groundwork for a concrete Implementation Plan to follow in 2010.

This Plan was created through the efforts of over 100 faculty, students and staff on all three UW campuses. An oversight team (Sandra Archibald, Evans School of Public Affairs; John Chapman, Facilities Services; Bruce Balick, Astronomy and Faculty Senate Chair; John Schaufelberger, College of Built Environments; Denis Martynowych, Planning and Budgeting; JR Fulton, Housing and Food Services; Stephanie Harrington, College of the Environment; Josh Kavanagh, Transportation Services; Elise Davis, Strategy Management; Ruth Johnston, Finance & Facilities; and Roel Hammerschlag, Stockholm Environment Institute U.S.) coordinated activities, discussed strategies and communicated across the teams. Several sub-teams were created to develop the Plan. The academic sub-teams were led by Bruce Balick, research; John Schaufelberger, curriculum; and Stephanie Harrington, outreach. The administrative sub-teams were led by John Chapman, campus energy supply; JR Fulton, campus energy demand; Steve Ashurst (UW Technology), information technology; Celeste Gilman (Transportation Services), commuting; and Tad Anderson (Atmospheric Sciences), professional travel. Denis Martynowych (Planning and Budgeting) led the financing team and Ruth Johnston (Finance & Facilities) led the Climate Policy Development and Implementation sub-team. Roel Hammerschlag served as the technical writer, Elise Davis served as project manager, Marilyn Ostergren (Ph.D. candidate, Information School) developed the accompanying graphics and undergraduate student support was provided by Jerid Paige and Aubrey Batchelor.