WORCESTER STATE UNIVERSITY

CLIMATE ACTION PLAN

Prepared by the President's Climate Commitment Task Force

1/24/2012

WORCESTER STATE UNIVERSITY

A commitment to a sustainable campus and a sustainable world:

Worcester State University is a public institution of higher learning set on 58 acres in the residential west side of Worcester, Massachusetts. We are dedicated to preparing students for personal success, rewarding careers, and effective citizenship in the 21st century.

We offer undergraduate and graduate degree programs in the traditional liberal arts and sciences, teacher education, biomedical sciences, business, and the health professions.

Key Data:

Student Headcount: 5,473

Full Time Staff: 289

Faculty to Student ratio: 1:17

Academic Programs:

Undergraduate majors: 25

Undergraduate minors: 29

Graduate programs: 21

Study Abroad programs: 67

About this report:

Welcome to our Climate Action Plan. Here we describe our approach to managing our impacts on society and the environment, our strategies for becoming carbon neutral and provide an account of our plan and performance.

All data is related to fiscal years 2007 - 2010 and cover campus operations unless otherwise noted.

We are developing strategies in all of our departments to strengthen our sustainability efforts and to further integrate sustainable practices in all that we do.

We look forward to sharing our progress with you and welcome your comments and suggestions for future reporting.

We invite you to visit www.worcester.edu/Greening for further updates on our efforts to create a sustainable future for everyone and we invite you to share your feedback with Robert.Daniels@worcester.edu or Steven.Bandarra@worcester.edu.

A Letter from the President

Greetings:

I take great pride in presenting the Worcester State University Climate Action Plan. The Climate Action Plan was assembled under the guidance of the Climate Commitment Task Force. This report outlines our history and accomplishments, and by way of analyses and observation, provides insight to the inspiring sustainability goals we have committed to on campus. This document represents a number of facets, and significant steps and actions we are taking toward becoming a more sustainable campus with a carbon neutral future.

We believe that, in order to be sustainable, we must address the long-term implications of our actions on the environment, the larger Worcester community, and the economy. These guiding principles lead us to offer high quality, affordable undergraduate and graduate academic programs, and to promote lifelong intellectual growth, global awareness, and career opportunities for our students.

We have partnered with the American Colleges and University President's Climate Commitment as a signatory to further solidify our pledge towards carbon neutrality. This report fulfills an initial requirement of ACUPCC membership, and provides a roadmap as the structure towards our on-going sustainability efforts and programs. Implementation of the report's mitigation strategies will contribute toward Worcester State University becoming a leader in sustainability. Our sustainability program management along with our innovation and environmental management will positively impact our carbon neutrality goals.

Thank you for taking the time to read this report. I hope you find it engaging and educational.

Sincerely,

Barry M. Maloney
President, Worcester State University

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1.0 Executive Summary & Introduction

The American College & University President's Climate Commitment (ACUPCC) is a network of institutions led by a steering committee of University Presidents and Chancellors. This initiative is supported by a group of non-profit organizations whose goals are to incorporate climate change and sustainability into the educational experience of all students and to achieve climate neutrality – at the earliest possible date.[1]

Worcester State University (WSU) became a signatory in 2007 and has pledged carbon neutrality in line with the ACUPCC's objectives. Participation within the network provides WSU with the opportunity to advance, monitor, and communicate its sustainability initiatives.

Worcester State University Campus – Ariel Picture

In 2010 then President Dr. Janelle C. Ashley assembled a President's Climate Commitment Climate Action Task Force (see Appendix A, WSU Climate Commitment Task Force) comprised of College community representatives including students, faculty, and administrators. Together they developed a plan to foster and grow campus sustainability with the goal of carbon neutrality. This plan also supports legislation and executive orders in effect within the Commonwealth of Massachusetts.

The WSU Climate Action Plan is comprised of the following elements:

- A summary of campus greenhouse gas emissions and target date for carbon neutrality;
- Examples of sustainability initiatives and learning outcomes within campus operations and curriculum;
- An outline of goals and greenhouse gas mitigation strategies that the campus will advance to move toward carbon neutrality;
- Defined metrics for reducing greenhouse gas emissions and impacts from facilities management and building operations, purchasing practices, transportation, waste management and commuting;
- A governance structure for program management

[1] Simpson, Walter, CEM, LEED AP, Cool Campus, A How To Guide for College and University Climate Action Planning, 2009, p 12

2.0 Campus Emissions (Carbon & Air Quality Management)

Gases that trap heat in the atmosphere are often called greenhouse gases (GHG).[2] During the past century humans have substantially added to the amount of greenhouse gases in the atmosphere by burning fossil fuels such as coal, natural gas, oil and gasoline to power our cars, factories, utilities and appliances. The added gases — primarily carbon dioxide and methane — are likely contributing to related climate change.[3]

At Worcester State University we track and translate progress of our sustainability activities in the form of greenhouse gas measurement; specifically metric tons of carbon dioxide equivalent (MTCO2e). This metric is our gold standard and aligns with the Commonwealth of Massachusetts legislation, Executive Order 484 (EO 484)[4] and the Global Warming Solutions Act (GWSA)[5] as well as the ACUPCC requirements for reporting progress towards carbon neutrality.

2.1 Greenhouse Gas Inventory Summary & Projections

To define and understand the University's carbon footprint, the Facilities Department conducted a comprehensive examination of campus operations for the calendar year 2008. The results of the 2008 WSU greenhouse gas inventory, total MTCO2e, have become the baseline WSU will use to assess progress and drive sustainability initiatives throughout the campus. New GHG emission calculations were completed as of January 2, 2011, providing the University with current insight and analysis of the contributors of GHG emissions on campus as well as revealing areas of improvement.

As of January 2011, the WSU Greenhouse Gas inventory shows that the University generates approximately 18,035 metric tons of carbon dioxide equivalents per year.

	Source	Tons per Year	Unit(s) of Measurement	Percent of Total
Scope 1, Direct emissions	Stationary Combustion	2,267	metric tons of CO2e	13%
	Mobile Combustion	131	metric tons of CO2e	1%
	Fugitive Emissions	45	metric tons of CO2e	0%
	Total	**2,443**	**metric tons of CO2e**	**14%**
Scope 2, Indirect emissions	Purchased Electricity	6,360	metric tons of CO2e	35%
	Total	**6,360**	**metric tons of CO2e**	**35%**
Scope 3, Other emissions	Commuting	8,992	metric tons of CO2e	50%
	Air Travel	240	metric tons of CO2e	1%
	Total	**9,232**	**metric tons of CO2e**	**51%**

*** 50% of WSU's emissions are derived from Faculty, Staff and Student commuting.**

[2] http://www.epa.gov/climatechange/emissions/index.html, printed February 15, 2011
[3] http://www.epa.gov/climatechange/science/index.html, printed February 15, 2011
[4] April 2007, Massachusetts Governor Patrick On April 18, 2007, Governor Patrick announced Executive Order 484 – Leading By Example: Clean Energy and Efficient Buildings URL - http://archives.lib.state.ma.us/handle/2452/41201/browse?type=title
[5] Global Warming Solutions Act, in August 2008 Governor Patrick made Massachusetts one of the first states in the nation to move forward with a comprehensive regulatory program to address Climate Change. URL - http://www.malegislature.gov/Laws/SessionLaws/Acts/2008/Chapter298

Scope 1, Direct emissions

"Direct emissions from sources that are owned and / or controlled by WSU. This includes combustion of fossil fuels in College-owned facilities or vehicles, fugitive emissions from refrigeration, and emissions from on-campus agriculture or livestock husbandry". [6]

Scope 2, Indirect emissions

"Indirect emissions from sources that are neither owned nor operated by WSU but whose products are directly linked to on-campus energy consumption. These include purchased energy: electricity, steam, and chilled water".[7]

Scope 3, Other emissions

"Other emissions attributed to WSU, include emissions from sources that are neither owned nor operated by WSU but are directly financed (e.g. commercial air travel paid for by the institution) and / or linked to the campus via influence or encouragement (e.g. air travel for study abroad programs, regular faculty, staff, and student commuting)"[8]

The WSU GHG inventory provided insight into campus operations and activities resulting in the development of mitigation strategies to reduce the University's "carbon footprint." For example, it was determined that the greatest contributors to our total footprint were commuting and purchased electricity. The findings supported prioritization of strategies and the development of a realistic action plan.

2.2. Reducing the WSU Carbon Footprint

In the process of creating the greenhouse gas inventory WSU has established a baseline and assessed its growth. This resulted in the development of mitigation strategies to assist in our path towards carbon neutrality.

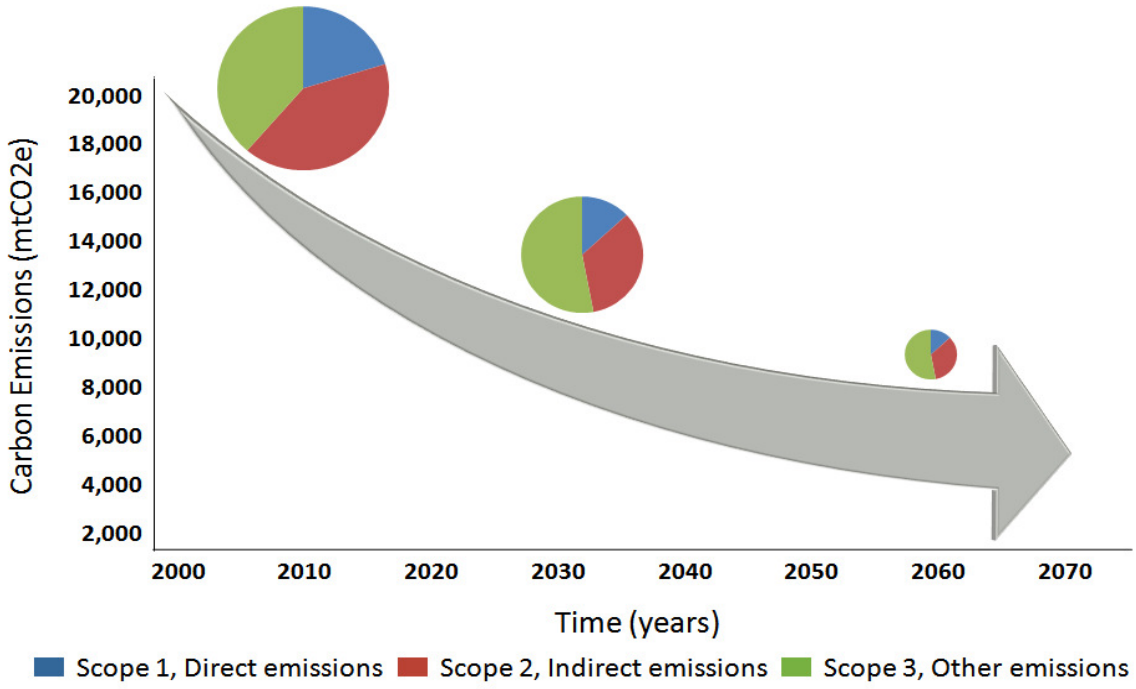


Figure I: WSU Decrease of Net Emissions by Scope and in Totality Over Time.

[6] Clean Air Cool Planet, Carbon Calculator User Guide, August 2008, p. 8
[7] Clean Air Cool Planet, Carbon Calculator User Guide, August 2008, p. 8-9
[8] Clean Air Cool Planet, Carbon Calculator User Guide, August 2008, p. 9

Numerous changes to buildings, mechanical systems and operations on campus have been implemented, where tangible results could be anticipated based upon the scope of the project, timeframe and resource availability. In the longer term, we at WSU realize we must also focus on engaging the larger campus community - our students, faculty, and staff - to drive behavioral change since commuting is such a large contributor to our greenhouse gas emissions.

WSU has committed to try to be carbon neutral by 2050 with the following interim goals.

Percent Change	By Year	From Baseline In	Scope
25%	2020	2008	I,II
50%	2030	2008	I,II
75%	2040	2008	I,II
100%	2050	2008	I,II

This is the just the beginning of our journey towards carbon neutrality. We believe we are poised to succeed with the following strategies.

3.0 Mitigation Strategies

Led by the University President's Climate Commitment Task Force, WSU intends to develop a sustainability strategy for the campus following the Triple Bottom Line[9] methodology that supports the mission for net carbon emissions.

Three overarching themes are embedded within the WSU sustainability strategy:

- Sustainability program management
- Innovation
- Environmental management.

Sustainability program management is the foundation for sustainability leadership, governance, management and accountability.

WSU Administration Building entrance

Innovation establishes a focus on cutting edge research, education for sustainable development and fostering and growing stakeholder partnerships.

Environmental management centers on energy consumption, water & waste management, and sustainable travel. The themes are further delineated into sustainability practices and projects which form the "mitigation strategies" that are outlined in the following sections.

Successful execution and goal achievement with our mitigation strategies rests upon, campus economics, available technology and Stakeholder & University leadership and support. These include emerging technologies, renewable energy, newly developed campus policies and campus wide collaboration.

3.1. Energy Conservation & Efficiency (Energy Consumption of Building Systems)

The recent WSU Greenhouse Gas Inventory indicates that a significant percentage of our emissions are derived from purchased electricity and stationary combustions, such as the fossil fuels used to power heating and cooling equipment that serve our academic and residential buildings (See Appendix B, WSU Campus Map). The report outlined energy efficiency and conservation measures for the University's existing buildings. Considering the opportunities for energy conservation and cost reduction within WSU's existing buildings, our energy conservation priorities are as follows:

1. *Mechanical systems and building envelope upgrades*
   Updates offering the greatest opportunity for improvement include:
   a. Upgrade the mechanical systems in our Science and Technology Laboratory building

[9] Triple Bottom Line, a method of evaluating corporate performance by measuring profits as well as environmental sustainability and social responsibility commonly referred to People, Planet, Profit.
http://dictionary.reference.com/browse/triple+bottom+line

b. Student Center mechanical system and exterior envelope.
c. Our Learning Resources Center Library will also make significant energy efficiency gains when select mechanical components are upgraded and the building envelope is improved.

2. *Building Electrical Improvements*
   a. Buildings with the most inefficient lighting fixtures and controls will be targeted for upgrades as funding becomes available.
   b. Major inefficient building system components will be upgraded as warranties expire, and paybacks of purchasing new equipment become realistic. Rebates, grants, and utility supported funding will all be considered in determining when replacement can occur. (This will also be the case for electrical and mechanical equipment.)
   c. Over time, appliances and non-building system equipment will be replaced with Energy Star rated, or generally energy-efficient models to reduce overall building loads.

"We do not inherit the earth from our ancestors; we borrow it from our children."

Native American Proverb

Over the previous couple of years WSU has implemented energy conservation strategies which have resulted in a more efficient operations and management highlighted in Figure 2, FTE Student Growth and KWh/FTE over Time. This is an exciting point in time, in which the University has the opportunity to positively affect such wide-ranging and interconnected issues.

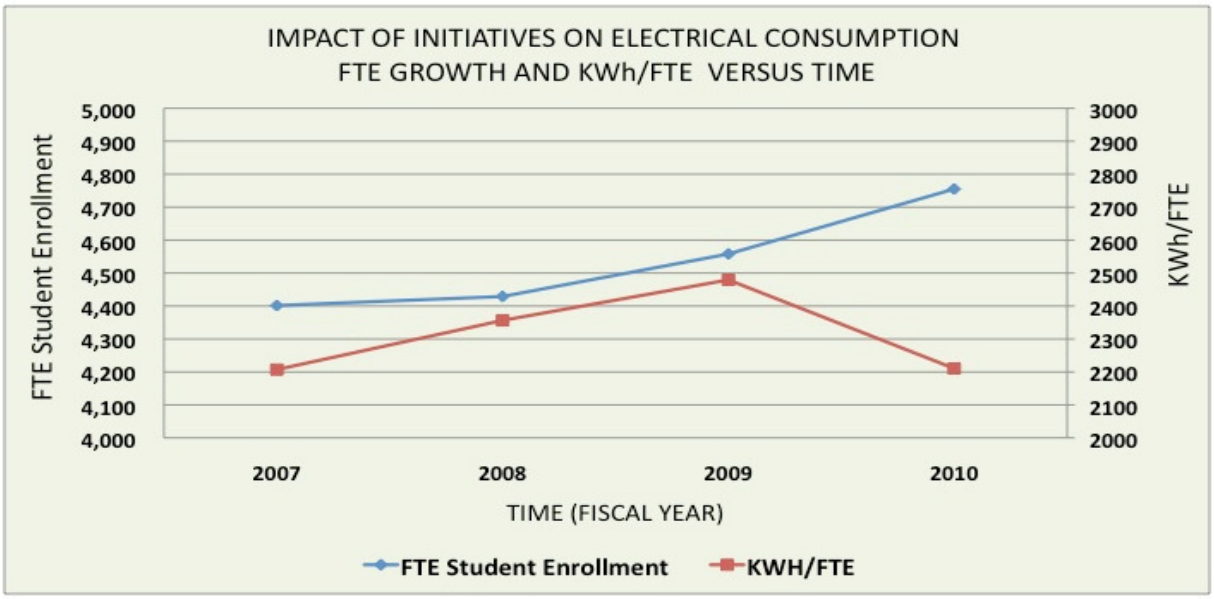


Figure 2: Impact of Environmental Initiatives on WSU Electrical Consumption (KWH/FTE) Aligned with FTE growth for the time periods FY2007-FY2010

3.1.1. Electrical Systems

WSU's average annual electricity consumption is approximately 10,490,862 KWh. Ninety-nine percent of the electricity is purchased and is considered a Scope 2 Source of Emissions while 1% is generated onsite through the WSU photovoltaic systems.[10]

The electricity demand has decreased over time, with a seven percent reduction between 2009 and 2010 alone. WSU expects the downward trend to continue with additional focus on increasing electricity generation through renewable energy sources and the continued replacement of inefficient components with new energy efficient components. The majority of the campus' electricity use sustains building operations, with the Gosh Science & Technology Center leading electricity consumption.

There are significant opportunities within WSU's existing buildings to conserve electricity and reduce operating costs. Lighting and equipment control strategies such as ventilation optimization projects, adjustments to the existing air-handling units, energy efficient lighting upgrades and occupancy controls can all reduce energy consumption.

What has been done so far:

- Installed a facility-wide Building Automation System (BAS) used to control the occupancy air make up and building exhaust as well as regulating certain components such as temperature and lighting control.
- Metering energy use in residence halls and throughout campus assists in calculating winter / summer peaks as well as monitoring and managing use to support efficient campus operations.
- Close partnership & collaboration with utilities and taking advantage of existing rebates, grants and value engineering.
- Lighting upgrades including a LED replacement campaign.

"It's not a choice between our environment and our economy; it's a choice between prosperity and decline."

President Barack Obama (2009)

The strategies listed below have been proposed to reduce the electricity consumption for electrical components of the mechanical systems, as well as reduce the fuel consumption of heating and cooling equipment:

1. Reduce fume hood exhaust rates by 50% or more to achieve reduction in lab exhaust and outside make-up air demand.
2. Implement demand control ventilation and variable frequency drives for the computer lab and multimedia classroom.
3. Provide occupancy lighting sensors for classrooms, conference rooms, offices and labs.
4. Convert existing direct expansion (DX) chillers into high efficiency water-cooled chillers.
5. Replace existing T-8 lamps and ballasts with high-performance T-8 lamps and matching ballasts and replace 2'x2' fixtures with RT5 fixtures.
6. Implement occupancy based HVAC controls on unit ventilators in classrooms, labs and offices, and through the facility's energy management system.

[10] WSU photovoltaic system, http://community.worcester.edu/webapps/portal/frameset.jsp?tab_id=_239_1&

7. Replace or upgrade air-handling units that heat and cool the building to reduce energy use and increase occupant thermal comfort.
    a. Full conversion of constant volume fan systems to Variable Air Volume terminal units.
    b. Unit conversion of constant volume air handling units to variable air volume operation.
8. Remove existing air-cooled chillers which are at the end of their life with a high-efficiency air cooled chillers.
9. Install a centralized demand ventilation control system and kitchen hood exhaust controls to reduce outside air demand in the Student Center.
10. Install occupancy sensors within dorm rooms to interface with the building energy management systems.
11. Using Vending Miser technology to save over 40% on typical vending machine energy use. Install occupancy controllers on vending machines campus wide. The controllers have a motion and temperature sensor that shut down lights and lets compressors idle which saves energy and prolongs the life of the machine.
12. Adjust power settings on all campus computers so that after being left unused for a set amount of time, they go into Powersave or Hibernation mode.[11]
13. Switch from paper towels in bathrooms to high-efficient hand dryers. The hand dryer reduces cost, keeps bathrooms cleaner and has health benefits as they reduce germ transfer.
14. Close the campus parking garage during the summer months to evaluate space utilization, hopefully leading toward optimizing available space and reducing energy consumption.
15. Install solar power led outdoor lighting.

3.1.2. Mechanical Systems (Addressing stationary emissions)

WSU CoGen System

The primary sources of our stationary emissions come from the mechanical systems used to heat and cool our buildings. The performance of these systems depends upon multiple factors: building envelope tightness and construction, size and efficiency of the system components, and the accuracy of control. How the occupants use the building has an effect on building performance.

A mechanical systems strategy employed by the University has been the development and adoption of a CoGen[12] system within an on campus student residence, Dowden Hall. The CoGen system transfers excess heat from the production of electricity to the buildings hot water system.

[11] Yale research shows that a computer in Powersave mode saved $0.156 each week; Hibernation mode: $0.168 week (assumes $0.12KWh)

[12] CoGen, cogeneration system also known as Combined Heat and Power (CHP), is the on-site production of two kinds of energy - usually electricity and heat - from a single source of fuel, http://www.ipsi.net/micro.htm

The following mitigation strategies are under review and are predicted to improve overall mechanical equipment efficiency, thus reducing electricity, fuel demand and associated emissions.

1. *Increase efficiency in the Gosh Science & Technology Building* by implementing a heat recovery system. A heat recovery system is estimated to save the University $27,046 with a 5.2 year payback and GHG emissions reduction of 17% for this building.
2. *Adopt a heating and cooling standard* to establish indoor temperature set point ranges for campus buildings. Implementation of this standard will not only reduce utility costs associated with heating and cooling buildings and serve as an educational opportunity for building occupants, but will also contribute to reducing campus GHG emissions.
3. *Create a plan for the replacement of appliances and stationary equipment* that have reached the end of their useful life with more efficient units under the guidance of the WSU Procurement Policy (see Appendix C, WSU Procurement Policies).
4. *Reduce infiltration of air into buildings* by sealing gaps if any in the building envelope.

3.2 Green Building Policy

Significant savings can be realized from making WSU's existing building portfolio more efficient.

As a Massachusetts State University, in compliance with Executive Order 484 and the Governor's *Leading by Example* Program, all campus new construction and major renovations must meet the Massachusetts LEED (Leadership in Energy and Environmental Design)[13] Plus Green building standard. This means the construction or renovation will address multiple environmental concerns including: site issues, water conservation, energy efficiency, material choices, and indoor environmental quality.

[13] Developed by the U.S. Green Building Council, LEED is an internationally recognized green building certification system, providing third-party verification that a building or community was designed and built using strategies aimed at improving performance across all the metrics that matter most: energy savings, water efficiency, CO2 emissions reduction, improved indoor environmental quality, and stewardship of resources and sensitivity to their impacts. http://www.usgbc.org/DisplayPage.aspx?CMSPageID=1988

What has been done thus far?

- LEED Gold Certification for 63,000 sq. ft. renovation of the College's Historic Administration Building:
  - Opened in 2009
  - Centralizes administrative and student services previously spread across campus
  - Designed to be energy efficient and conserve water; 30% and 20% improvement respectively
  - Selected as the Green Building Award Winning project and featured in *Real Estate & Construction Review*, Northeast Green Success Story edition.
  - 75% of all construction, demolition and land clearing debris was recycled
  - Building features include:
    - White heat-reflecting roof material installed throughout
    - Window Replacement with larger, operable unit for increased daylight, fresh air and views
    - Updated high efficiency condensing boiler plant
    - Low flow toilet fixtures installed
    - Pavement reduced by means of converting a parking into a green plaza with minimal drip irrigation
    - Bicycle storage and preferred parking spaces provided for fuel efficient vehicles
    - Passive shading of the building and new plaza with newly planted trees
    - Low VOC products throughout the interior
    - Occupancy sensors
    - Highly efficient light fixtures, and programmable digital lighting controls allowing the project to be 30% more energy efficient than required by Massachusetts code.

WSU Administration LEED GOLD Plaque

- LEED Gold Level Certification for the new Dowden Residence Hall
  - Natural-gas combined heat and power cogeneration system
  - Energy-conserving lighting
  - Windows and plumbing ensuring operational efficiency
  - Resource-saving building practices included the recycling of building materials and sourcing of locally produced materials during the 18-month construction process.

Strategies to further WSU's green building program are:

1. Manage campus housing and office space more effectively through space planning and management enhancements. Consider implementation of standard evaluation practices of space needs for new construction and renovation projects.

2. Establish a Campus Master Plan for new development to ensure a compact building footprint which will mean reduced infrastructure end decreased impact on virgin land.

3. For new construction and major renovations of existing buildings, that whenever feasible meet or exceed Executive Order 484 and the Massachusetts LEED Plus Green Building Standard.

4. Consider developing an incentive and training program for campus Project Mangers, planners, facility staff, etc., to become LEED Green Associate accredited.

3.3. Electricity Procurement (Addressing purchased electricity only)

WSU has effectively and efficiently managed electricity consumption as indicated within the Energy Conservation and Efficiency introduction and illustrated by Figure 2, FTE Growth and KWh/FTE versus Time.

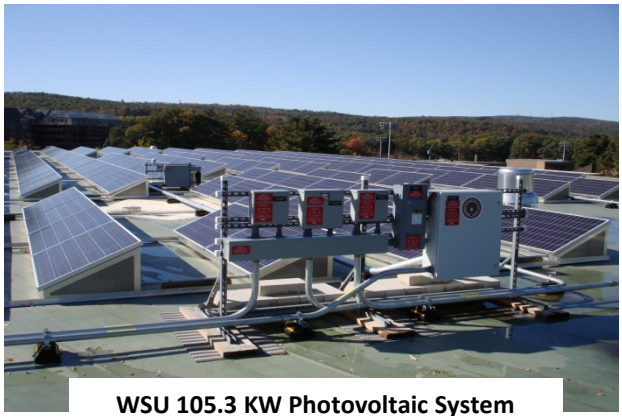
The University has many options for managing electricity procurement, including the purchase of renewable energy credits (RECs), energy produced by renewable sources at a direct 1:1 correlation, and state mandates which would require a certain percentage of electricity sold within a specific jurisdiction be supplied from a renewable energy source. WSU has chosen to explore and invest in the potential to generate its own electricity by means of photovoltaic panels.

Technological advancement and availability of these tools to the University will influence future electricity procurement strategies. For now, the institution adopts a holistic approach in this area, evaluating educational and research opportunities for the campus and students as well as overall environmental impact.

3.4. On-Campus Renewable Energy Technology

While the University is managing its electricity consumption and energy demands towards a bare minimum, we recognize that we must still meet our demand with something. The "something" is campus-produced renewable energy. There are several options for on-site renewable systems, including:

- Biomass
- CoGen, combined heat and power
- Fuel Cells
- Solar electric (photovoltaic arrays)
- Solar hot water
- Wind energy



WSU 105.3 KW Photovoltaic System

In 2009, the university installed a 105.3 KW DC Solar Photovoltaic array on the roof of the WSU Learning Resources Center. At the time of installation it was the largest university campus installation in the Commonwealth of Massachusetts and the largest in the city of Worcester. The system installation was made possible due to funding by IRS Clean Renewable Energy Bonds (CREBS) and a grant from the State's Clean Energy Center. The system was manufactured and constructed within the state of Massachusetts and is expected to generate 140,000 KWh annually over its 30-year lifetime. Also, in 2011, using a Power Purchase Agreement the university added a 40KW array, located on top of Wasylean Hall. The University anticipates current and future practices, enabled by technical advancement, will enable us to meet the electric power needs on campus.

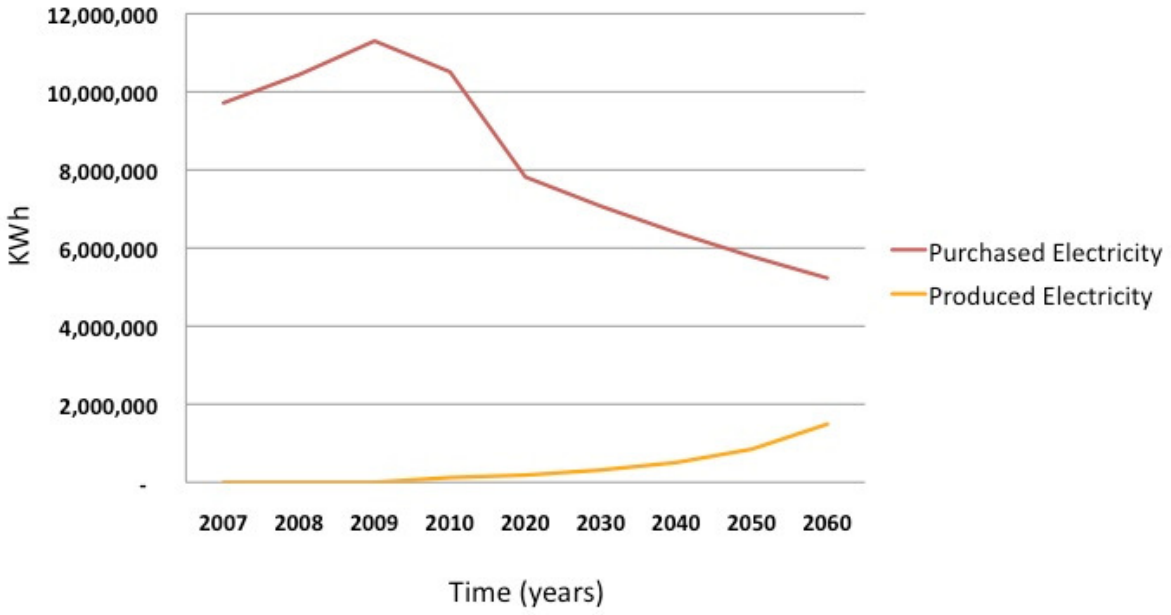


Figure 3: Projected WSU Electricity Purchased versus Electricity Produced (KWh per Year)

3.5. Waste Management

Waste Management, identified as Product Life Cycle Management on Worcester's campus, encompasses the purchase of a product, its use within campus facilities and operations, and the ultimate disposal of the product. It is categorized and viewed under these tasks due to initial purchasing, management and disposal costs and the long-range impact on University sustainability. On campus, we practice our waste management through "reduce, reuse and recycle."

Big Belly Solar Receptacle

We attempt to purchase in amounts that are predicted to be used in a finite period of time. In many instances disposing of unused product can be equal to or more expensive than the purchase price, resulting in "volume buying" becoming the most expensive method of purchase. We choose storage areas that meet the product specifications and when the product is fully exhausted, when possible, we recycle.

Since 2006, single stream recycling has been in place contributing to a doubling of campus recycling rates. Listed below are some accomplishments of the University's waste management system. In FY2010 alone,

- The University recycled 16 tons of construction demolition waste;
- Over 14 tons of computers, televisions, keyboards, used toner cartridges, cell phones, batteries and various other electronic components were sent off to a local equipment recycler; 100% was recycled;
- Approximately 24,480 lbs. of surplus furniture and 1,800 lbs. of old fluorescent and CFL lamps, ballasts and mercury thermometers, switches and devises were recycled.

Other deployed waste management strategies include -

- Elimination of cafeteria trays, the "tray-less initiative", supporting water conservation and reducing food waste.
- Big Belly Solar intelligent waste collection system, lowering operating costs, fuel consumption, and greenhouse gas emissions associated with the waste and recycling collection process.
- Between the years 2008 - 2010, over eight tons of food waste was diverted from the university's solid waste stream to feed pigs at Sayebrook Farms in Holden, Massachusetts.

Future plans will incorporate -

- Development of a life cycle assessment program to determine the most sustainable purchase choice of products taking into account life expectancy of product, environmental impact, and cost.
- Adoption of an energy-efficient appliance purchasing policy requiring the purchase of ENERGY STAR certified products in all areas for which such rating exists.
- Improved method for recycling of organics.

The University has a proposed policy for Environmental Preferred Purchasing (Appendix C, WSU Procurement Policies), which influences behavior in support of our carbon neutrality goal.

3.6. Travel (Travel & Commuting, Parking)

Until recently campus travel was not associated with contributions to campus carbon emissions. However, after the last greenhouse gas inventory, commuting influence was widely recognized and documented. The University is collecting and reviewing information to support future policies directed towards vehicle use and parking guidelines, carpooling and commuting services and purchasing of gasoline and diesel fuel for University vehicles and equipment. At present the University is working to educate and communicate with its visitors, faculty, staff and students', highlighting the effect traveling and commuting has on its sustainability goals and the environment.

3.7. Educational, Research and Public Engagement

Sustainability awareness is already woven into the fabric of campus activities with established academic programs, research opportunities and community engagement supporting sustainability education, employment, and lifestyle.

Success in achieving Worcester State University's climate goals will require the active participation of the entire institution, as well as the wider Worcester community. Behavior change, fostered by education and community engagement, will be instrumental in bringing about a sustainable future at WSU.

The establishment of a "Office of Sustainability" would further this effort by creating an all-encompassing program to help achieve the University's goals of being a leader, educating all students on the concepts of sustainability, developing leaders within the campus community and ensuring sustainability goals, strategies and achievements are met and communicated across campus.

3.7.1. Curriculum

Several programs already in place at Worcester State University provide students with classroom experience as well as extracurricular opportunities related to sustainability practice and environmental issues.

- *Sustainability Fair*: For the previous three years, the Center for Service Learning and Civic Engagement, Career Services and Campus Ministry has hosted a Sustainability Fair with the mission to introduce and increase awareness of the importance of a "green" and sustainable lifestyle, to provide resources, information and opportunities for work, advocacy and change, and to encourage the community within WSU that supports cooperation and responsibility for the preservations of the planet.
- *Environmental Chemistry*: The Chemistry Department established an Environmental Chemistry Track. The program was made possible in part by a three year, $200K grant from the Stoddard Charitable Trust. From the Worcester Statement, fall 2007: Under the direction of Associate Professor of Chemistry Margaret Kerr, PhD, WSU adopted a green chemistry curriculum for its organic laboratory sequence three years ago, putting the University well ahead of its peers. Worcester State is the only University in the area that has a green chemistry program," she stated. "The skills our students are learning are becoming increasingly valuable in the workplace."
    - The green chemistry related courses offered are: CH 220 Chemistry of Energy and the Environment, CH 320 Environmental Chemistry, CH 330 Environmental Toxicology, and CH 335 Green Chemistry.

As of the fall 2011 the following environmentally focused academic courses have been offered:

GE 240	Energy Conservation
GE 220	New England Watersheds
GS 305	Geological Hazards
GE 307	American Public Lands: Environmental Issues
GE 308	Environment and Development
GE 341	Fundamentals of Renewable Energy
GE 342	Sustainable Housing
GE 359	Environmental Systems & Public Policy
GE 361	Public Policy & Environmental Issues
GE 258	Global Environmental Change
UR 101	Introduction to Urban Studies
UR 201	Analysis of Urban Systems
CH 220	Chemistry of Energy and the Environment
CH 320	Environmental Chemistry
CH 335	Green Chemistry
CH 330	Environmental Toxicology
BI 202	Principles of Ecology

Additionally, within the business department, there are courses that discuss supporting business and managing sustainability. Topics such as corporate social responsibility, triple bottom line, and environmental ethics are covered.

WSU Students Running a Lab Experiment

Beyond the classroom there are also abundant opportunities for students to get involved and engaged:

- *Fellowships / Internships*: matriculated students in good academic standing are eligible for internship or fellowship placement. Each program is designed to accommodate and articulate the personal goals of the student, the academic goals of the department, and the needs of the participating off-campus organization.
- *Study Abroad*: The WSU International Programs Office is committed to the internationalization of our campus. Students are encouraged to study abroad or take advantage of service learning programs to expand their cultural and social understanding.

Additional sustainable curriculum strategies WSU is pursuing to engage students, faculty and staff include:

1. Educate the campus constituents on what efforts have been taken to develop a Climate Action Plan, what the next steps are and how they will be engaged in the plan.
2. Research Green Workforce training programs that could be offered at WSU or in partnership with nearby institutions.
3. Engage faculty and staff to embrace sustainability in their daily routine by piloting a Green Office Certification program to give recognition to departments that meet certain sustainability goals.
4. Incorporate at least 30 minutes into orientations for new Student, Staff and Faculty addressing sustainability or green campus initiative information.
5. Work with International Studies to determine if there are study abroad opportunities. Encourage faculty to collaborate on cross-disciplinary and team-taught courses. One example would be Environmental Psychology or Sustainable Development as a Model for Financial Security and Profitability.
6. Ensure facility managers remain current on the concepts of green building, commissioning and preventative maintenance.

3.7.2. Research

At WSU, both undergraduate and graduate students can engage in a wide variety of research topics under the guidance of highly respected and talented faculty.

- *National Science Foundation Grant*: Professor Dr. William Hansen was awarded a $135K dollar grant from the National Science Foundation for the project "The College & the Community: Integrated Research & Curriculum Using Geospatial Tools."
- *Research Seminars*: Most Academic programs at WSU offer a Research Seminar guided by program faculty. These Seminars are opportunities for students to develop their research skills and begin working on projects of their own interest.

Measuring Carbon on the Ghosh Science & Technology Center

- *Research:* Dr. Allison Dunn and resident global warming expert, is conducting carbon sequestration research and measuring the carbon dioxide within the environment.

3.7.3. Stakeholder Partnerships (Public Engagement)

Worcester State University works with a number of community organizations and service-learning centers that enrich student's education and build a culture for mutual support between the campus and the City. These relationships and programs benefit both the campus community and the greater community of central Massachusetts.

Stakeholder activities in which WSU takes part are:

- *WSU Green Campus Initiative* was developed to communicate what sustainability initiatives are happening on campus. This website should be updated and managed on regular basis as means for education and communication to the campus and broader community.
- *WSU-sponsored Centers and Institutes* that focus on topics ranging from online learning, to Business & Industry to Community Media.
- *CSA*[14] */ Farmer's Market* bringing local and organic products to campus. Engaging the broader campus community in sustainable food systems.
- *The WSU Environmental Advocacy Group*, a student run organization partnered with the Union of Concerned Scientists and the Blackstone River Watershed Association focused on environmental education and support of student led environmental initiatives.
- *Colleges Of Worcester Consortium* - Twelve Central Massachusetts Colleges, along with a number of Worcester area organizations, comprise the Worcester Consortium for Higher Education. In addition to cultural activities, interdisciplinary programs, and other opportunities, the Consortium provides a cross-registration service whereby full-time day students of member Universities can register at no additional cost for one course per semester at another campus.

"We need to treat climate change not as a long-term threat to our environment but as an immediate threat to our security and prosperity "

John Ashton, UK Ambassador on Climate Change to UN (2011)

[14] CSA, Community-Supported or Community-Shared Agriculture, is also known as "subscription farming." You buy a subscription from a local farmer just like you buy a subscription to Time or Newsweek. But instead of receiving a magazine each week, you receive a "share" of fresh, locally grown or raised fruit and/or vegetables. Some farmers also offer CSA subscriptions for farm-fresh eggs, and/or meats.
http://www.illinoisfarmdirect.org/Learn_More/csa.html

4.0. Natural Resource Use & Other Environmental Efforts

At Worcester State University we recognize our dependence upon the earth's natural resources for our daily needs and support of campus facilities and operations. We attach importance to resource ecology, land use, our water resources, resource technology, and related endeavors leading to guidelines and environmental purchasing policies, water reduction and management systems, among other environmental efforts.

4.1. Water Reduction & Management Systems

Worcester State is employing a variety of strategies to conserve and safeguard its water resources. Technologies like low-flow fixtures, high efficiency valves, and new efficient dishwashers in the campus dining facility help reduce water consumption in campus buildings. Landscape management best practices, like irrigation with rain sensitive hardware and drought-tolerant native plants also help the University save water and protect local watersheds.

Improvements to water reduction and management strategies are a priority for the University. This would include:

- Continued commitment and participation of senior management,
- Establishing water targets and key performance indicators,
- Water metering and,
- Monitoring by way of water supply management and operating and maintenance procedures,

- all while complying with pertinent regulations and requirements.

4.2. Storm Water Management

Storm water flooding and non point source pollution such as nutrients, pesticides and bacteria are a threat to the campus and the environment – specifically the Blackstone River Watershed. The way WSU manages these potential risks is addressed in several plans, but specifically depends on Lake Ellie. Lake Ellie is the storm water retention basin, and is designed to capture campus storm water, filter it and then discharge it into Moore Brook.

- Lake Ellie was designed to collect silt and storm water runoff to prevent the runoff materials from entering Moore Brook.
- Regular dredging of Lake Ellie collects and removes the associated silt and provides research opportunities for the tagging of inhabited fish and crustacean species in the lake.

Lake Ellie 'Science Lab'

Lake Ellie provides multiple opportunities to the campus, as a storm water management system, and outdoor classroom, and opportunity for students to gain real-world ecology research that can't be created in the laboratory for the study of Biology & Aquatics, plus it is aesthetically pleasing.

5.0 Financing

The University has successfully implemented and funded a wide variety of energy-savings and renewable energy projects over the past seven years. There are a number of financing opportunities available to Worcester State University to help reach its greenhouse gas reduction efforts. Among them are:

Research/Grants

An increasing number of foundations, state agencies and other research funding entities are providing support for climate change, renewable energy and high-performance building technology research. The University administration and faculty have been successful in the past several years in securing funding for several unique sustainability initiatives, including:

- $200K, three year grant from the Stoddard Charitable Trust, providing the Chemistry Department an opportunity to establish an Environmental Chemistry Track.
- $135K National Science Foundation grant to Professor Bill Hansen supporting the project "The College & the Community: Integrated Research & Curriculum Using Geospatial Tools."
- IRS Grant, Clean Renewable Energy Bonds (CREBS), used for the 105.3 KW DC Solar Photovoltaic array system and installation.
- Massachusetts DOER "Lead by Example" grant for energy audit and water fixture upgrades.

A "Green Grants" Committee has been recommended to be responsible for pursing and tracking sustainability related opportunities. The Committee would also ensure that there is communication and coordination of the proposal across disciplines and departments.

Utility Rebates

As a Massachusetts electric and gas customer, WSU has the opportunity to take advantage of significant energy rebates, offered by the Commonwealth's utility providers. WSU has already taken advantage of these opportunities by working with NSTAR, National Grid, and consultants Andelman & Lelek to investigate Energy Conservation Measures on campus.

The potential cost savings that could be realized from state utility rebate programs and the State's Clean Energy Center programs should be considered when evaluating the feasibility of different sustainability projects.

Performance Contracting

Energy performance contracting (EPC) is a financing strategy that allows the client to engage in energy efficiency projects without having the burden of investing significant upfront capital costs. The actual energy savings from installed efficiency and renewable energy measures (including technologies, equipment, installation and ongoing maintenance services,) finances performance contracting and capital projects. Energy Performance Contracting projects are typically delivered by an Energy Service Company (ESCO) and typically consist of the following elements: turnkey service, comprehensive measures, project financing and guaranteed project savings.

Each Energy Performance Contracting project is different but, typically, the contract between the ESCO and the owner calls for the ESCO to provide a full scope of services, including:

- An energy audit
- Comprehensive and tailored design of energy efficiency
- Water savings and renewable energy measures to employ at the facility

- Installation of equipment; training of facilities staff
- Long-term monitoring and verification of project savings

The ESCO enters into an energy service agreement (ESA) with the party making the decision to improve energy performance and with a third party financial investor, who could be a bank or the ESCO itself. The ESCO monitors the energy measures and provides a guarantee that the savings produced over the course of the contract will at a minimum cover the cost of the project.

There are multiple benefits of a University engaging in an ESA, including:

- The facility manager makes no upfront capital investment because the ESCO provides the financing and assumes the technical risk.
- Depending on the contract, the client may not assume any financial risk for the project.
- Cash flow is generally positive.
- The ESCO is incentivized to maintain and commission the project equipment over the life of the contract which means when the client takes ownership of the equipment it is likely to last longer.
- Once the payments have covered the ESCO's cost of doing business, plus a percentage profit outlined in the contract, further savings benefits belong to the client.

Endowment

One method of financing sustainability projects over future years is to invest endowment funds in projects that have a high rate of return. WSU will look into funding energy saving projects with a short-term payback period (between one and three years) that expect to reap a higher rate of return than that of the endowment portfolio. Realistically, only projects with a very quick payback could be funded to see the return on investment (ROI) expected.

Gifts

When planning sustainability projects at WSU, there should be close coordination with the alumni and fundraising offices. Alumni, corporations and students may be interested in supporting sustainability efforts specifically, and these gifts can often help make most cost prohibitive projects possible. Examples of categories that could be created for Gift Giving are: renewable energy installations, green roof for research and tours, other unique green building technologies, academic programs, or student and research opportunities.

Operating budget

The WSU operating budget provides for most of the renovation, construction, maintenance and sustainability projects that are ongoing or planned. A process to review proposed projects integrating both cost-effectiveness and environmental impacts and reducing GHG emissions is under review.

6.0 Tracking and Performance Management

The sustainability goals and metrics set forth by WSU are ambitious and represent a transformation in strategy for the University. To coordinate and ensure long-term success of the various initiatives referenced in this Climate Action Plan (CAP), WSU will use a program planning and tracking tool called Sustainability Scorecard. This scorecard approach sets a framework for comprehensive performance management, communication and analysis of metrics and provides focus and alignment of goals and initiatives across departments and over time. Leadership, program timeline and strategy implementation procedures will be put in place to monitor effectiveness and progress towards WSU sustainability goals.

Assessment of progress will be measured not only by GHG reductions, but also by evaluating success that sustainability initiatives have with impacting the changing culture and knowledge base of the WSU community. The sustainability scorecard is a consistent and repeatable process and methodology but is flexible and can adapt to the institution's changing goals and priorities.

WSU Campus

Currently the Sustainability Task Force, made up of a diversity of stakeholders, is responsible for managing WSU's Sustainability Scorecard, CAP planning process and bi-annual GHG reporting requirements per the ACUPCC. It is recommended that the Task Force remain in place, as it serves to address cross-disciplinary interests and can be a useful network for communicating sustainability goals across campus.

In order to establish WSU as a leader among its peer institutions, the University has recently established an Office for Sustainability to formally manage sustainability efforts taking place across campus departments and community groups. A full-time Sustainability Coordinator position was added to run the program, with the support from student interns. The Sustainability Coordinator will work closely with the Task Force and is responsible for tracking and reporting on progress as outlined in WSU's Sustainability Scorecard. The Coordinator is also responsible for tracking progress by:

- Working with the Public Relations department to maintain the WSU Green website and using the site to communicate sustainability goals, impacts and lessons learned.
- Compiling data and reporting bi-annually to the ACUPCC.
- Revisit this Climate Action Plan every three years to revise goals and refine targets.

This report was developed to communicate the University's progress and goals. It is also is work in progress. The success of the University in achieving its climate goals will depend upon how closely involved parties engage with the sustainability task force, the sustainability scorecard, and the programs offered by the University.

Appendices

APPENDIX A: Worcester State University Climate Commitment Task Force

WORCESTER STATE UNIVERSITY
PRESIDENT'S CLIMATE COMMITMENT TASK FORCE

The **purpose** of the PCC task force is to develop a comprehensive Worcester State University climate action plan for becoming carbon neutral.

The **composition** of the Worcester State University President's Climate Commitment Task Force includes:

1. Associate Director of Facilities, Environmental Safety Officer (Chair)
2. Director of Facilities
3. Vice President, Administration & Finance
4. Associate Vice President, Public Relations & Marketing
5. Director, Career Services
6. Director, Residential Life (Student Affairs)
7. Information Technology, equipment & network
8. Professor, Green Chemistry
9. Professor, Urban Studies
10. Faculty, Physical & Earth Science (GIS)
11. Student & President of Environmental Advocacy Group
12. Student

WORCESTER STATE COLLEGE

Office of the President
486 Chandler Street • Worcester, MA 01602-2597
508-929-8020 • FAX: 508-929-8191 • email: jashley@worcester.edu

MEMORANDUM

DATE: April 23, 2009

TO: Sandy Olson, Director of Facilities

FROM: Janelle C. Ashley, President

RE: Climate Action Plan Task Force

Worcester State College is a signatory to the American College & University Presidents Climate Commitment. To date there are 620 institutions that are signatories to this commitment. The specifics of the commitment and the steps that we have agreed to take in pursuit of climate neutrality can be found at http://www.presidentsclimatecommitment.org/html/commitment.php .

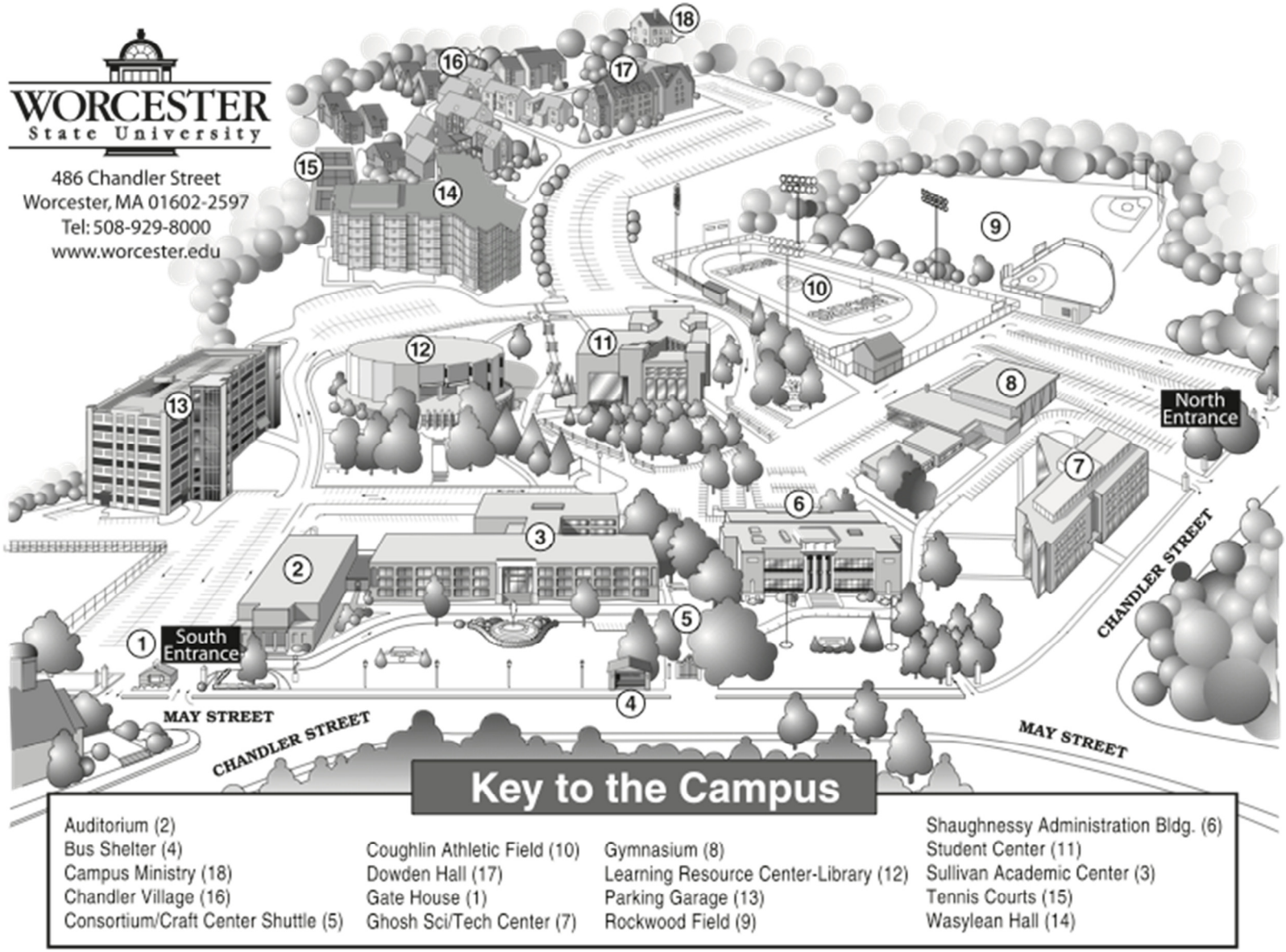
I have chosen to use a task force format to guide the development of a comprehensive climate action plan. Please accept this invitation to serve on the Climate Action Task Force. The task force will be led by Robert Daniels, WSC Environmental Safety Officer, and comprised of representatives from the college community.

The Climate Action Task Force is charged with the responsibility of developing an institution action plan for becoming climate neutral. When developing the plan the task force must consider legislation and executive orders that are in effect within the Commonwealth of Massachusetts.

I look forward to the work of the Climate Action Task Force and appreciate your service to the college.

Please contact Deb Quinn in my office with your acceptance to serve on this Task Force, either at extension 8020 or debquinn@worcester.edu

APPENDIX B: Worcester State University Campus Map



APPENDIX C: Worcester State University Procurement Policies

Worcester State University

Environmentally Preferred Product Procurement Guidelines

These Environmental Procurement Guidelines are intended to support WSU sustainability and budget goals by reducing and recovering toxins/waste from landfills, improving indoor air quality for building occupants across campus, increasing recycling rates, improving environmental landscaping practices and reducing energy usage of appliances.

1. Executive Order No. 515 Overview

On October 27, 2009, Governor Deval Patrick signed Executive Order #515 which established an Environmental Purchasing Policy for all Commonwealth Executive Departments, to help to conserve natural resources, reduce waste, protect public health and the environment, and promote the use of clean technologies, recycled materials, and less toxic products. This new policy requires all Commonwealth Executive Departments to reduce their impact on the environment and enhance public health by procuring Environmentally Preferable Products (EPP) and services whenever such products and services are readily available, perform to satisfactory standards, and represent best value to the Commonwealth.

2. Purpose

This policy is adopted to:

- purchase products that include recycled content in order to support strong recycling markets,
- institute practices that reduce waste by increasing product efficiency and effectiveness, use products that are durable and long-lasting, and reduce materials that are landfilled,
- purchase products and institute practices that conserve energy and water, use agricultural fibers and residues, reduce greenhouse gas emissions, use unbleached or chlorine free manufacturing processes, and use recycled wood and wood from sustainably harvested forests,
- purchase energy from renewable or green sources in preference to fossil fuels,
- purchase products that are free of mercury and lead and eliminate the use of other persistent bioaccumulative toxic chemicals where possible,
- increase the use and availability of environmentally preferable products, services and distribution systems that protect human health and the environment,
- support emerging and established manufacturers and vendors that reduce environmental and human health impacts in their services and production and distribution systems, and
- create a model for successfully purchasing environmentally preferable products and services that encourages other buyers and consumers in our community to adopt similar goals.

3. Specifications

3.1 General Specifications

In recognition of the need to make more efficient use of our natural resources, create markets for the materials collected in recycling programs, reduce solid waste volume and disposal costs, and serve as a model for other institutions, Worcester State University is committed to purchasing products which are

Environmentally Preferable and/or made of recycled materials whenever such products meet quality requirements and are available at reasonable prices and terms.

To the maximum extent practicable, without compromising safety and quality, the following standards should be adhered to:

1. Adhere to the EPP purchasing and specification recommendations directed by Eo #515 whenever feasible;
2. Follow the mandatory EPP purchasing and specification requirements whenever any of the listed commodities or related services is being purchased; including Energy Star® specifications for energy efficiency;
3. Promote the procurement and use of EPPs which have not been designated by OSD whenever feasible, and when cost, performance and availability are not compromised;
4. Take into account any environmental and health impacts resulting from their purchases and ensure that such purchases meet the EPP specifications established for such items;
5. Consider the "total cost of ownership" including costs associated with the transportation, use, operation and disposal of such products and services in their departmental and state contract procurements;
6. Identify at least one individual charged with the management and coordination of this program; such individual may be the Sustainability Coordinator and/or other personnel deemed necessary to support the implementation and enforcement of the program;
7. Educate and inform all WSU College Faculty, Staff, and Students about EPP and the OSD requirements;
8. Encourage staff participation in EPP procurement training sessions and other free workshop opportunities and;
9. Departments shall ensure that all contracts for printing require the inclusion of an imprint identifying the recycled content of the paper whenever practicable, along with the recycling symbol;
10. Identify in Invitations to Bid; Bid Packages; RFR's, RFQ's, RFP's that additional points will be awarded to vendors of EPP;
11. Work with OSD to ensure that vendors on departmental contracts provide annual EPP purchasing data typically within 90 days of the close of each fiscal year;
12. Incorporate, wherever possible, the use of EPPs in health and human service contracts, construction, renovation and maintenance contracts, food service contracts, lease agreements, grant programs, and other contracts.

Executive Order #515 calls for environmental procurement initiatives in the areas of: Energy Efficient Products, Toxics Reduction, Recycled Content and Waste Minimization and Sustainable Materials. The specific guidelines for these purchasing categories are outlined below.

3.2 Energy Efficient Products

When procuring products that consume energy, all statewide contracts and WSU procurements shall follow the directives set forth in Executive Order No. 484 and take into account, in the procurement's specifications, the lifetime energy costs necessary to operate energy consuming products and equipment. The EPP Program shall establish minimum energy performance standards, taking into account initial and operating costs, and agencies shall adhere to said standards.

At a minimum, unless otherwise set forth in the minimum energy performance standards, WSU shall:

• Office Equipment - Procure only ENERGY STAR rated office equipment, appliances, HVAC equipment, and other ENERGY STAR rated products unless such products can be demonstrated to be cost prohibitive over their life;

• Power Saving Mode - Ensure that all ENERGY STAR equipment has the power saving mode enabled at the time of installation and that all staff are aware of these functions and their benefits;

• Light bulbs - Purchase only energy efficient light bulbs, such as, but not limited to, compact fluorescent lamps (CFLs) or light emitting diodes (LEDs) unless the purchase of a standard bulb, such as an incandescent, is necessary for a specific purpose or function that can only be served by said bulb;

• Linear light bulbs - Procure the most efficient and cost-effective linear lights possible that will meet agency needs and, wherever possible, replace older lamp ballasts with newer more efficient electronic ballasts;

• Street lights - Ensure that all new street lights utilize the most efficient light sources possible and that all traffic lights installed or replaced by Commonwealth agencies utilize only LEDs or similarly efficient technology; and

• Other products - Support the procurement of other energy efficient products wherever possible, including but not limited to high efficiency motors, tankless water heaters, programmable thermostats, heating, ventilation and air conditioning units/systems, and food service equipment.

3.3 Toxics Reduction

WSU shall, wherever feasible, eliminate products procured that contain toxic chemicals in concentrations that pose a significant threat to the environment and/or public health. When less toxic or non-toxic alternatives are readily available, meet WSU performance requirements, and are cost competitive, the EPP Program shall move promptly to make these alternatives available through Statewide Contracts. WSU shall purchase only these less toxic or non-toxic alternatives unless it can be demonstrated that such alternatives do not meet the essential needs.

Through statewide, institutional and/or departmental contracts, WSU shall:

• Cleaning Products - purchase and use only those cleaning products, including floor finishes, that meet the environmental specifications established by the EPP Program;

• Cleaning Service Contractors - within one year of the adoption of this Guideline, require cleaning service contractors to utilize cleaning products that meet the same or better EPP standards;

• Integrated Pest Management - require pest control firms or licensed Commonwealth staff to employ an integrated pest management (IPM) approach (less toxic pesticides and an integrated approach to controlling pests) Commonwealth facilities;

• Non-Mercury Alternatives - ensure adherence to the Massachusetts Mercury Management Bill, prohibiting the purchase of any product containing mercury when non-mercury alternatives exist (not applicable to fluorescent lights);

• VOC products - procure products that contain no or low amounts of Volatile Organic Compounds (VOC) wherever feasible, including but not limited to office equipment, furniture, flooring, paint, and construction materials; and
• Computers, monitors, laptops - purchase computers, monitors, laptops, and other relevant equipment that are EPEAT registered at the Silver level or higher (www.epeat.net). Products must also comply with the latest set of Energy Star® guidelines (www.energystar.gov) and be shipped with the Energy Star power management features enabled; contractors must provide training to all customers on the use and benefits of Energy Star features.

Additionally, WSU should make an effort to increase the procurement of:
• Less toxic water treatment chemicals and processes;
• Paper products processed without elemental chlorine;
• Organic and/or less toxic fertilizers, pesticides, and other landscaping products;
• Vehicle tires with lead-free wheel weights;
• Packaging in conformance with the specifications developed by the Coalition of Northeastern Governors designed to reduce heavy metals and toxics;
• Furnishings, clothing, and other products that meet required flammability standards without the use of toxic flame retardants known as PBDEs.

3.4 Recycled Content and Waste Minimization

WSU shall procure products that comply with all recycled content and waste reduction standards established by the EPP or the U.S. Environmental Protection Agency's Comprehensive Procurement Guidelines (CPG). OSD has determined that the commodities listed below are available at a value and quality comparable to non-environmentally preferable counterparts. In an effort to assist WSU, OSD has established statewide contracts for each of the commodities listed in this section. When contracting with a vendor, WSU shall consider the ultimate disposal of products and their packaging when developing contract specifications and making contract awards.

Paper Products and Office Supplies

- printing and writing papers, computer paper and forms, envelopes – minimum 30% post-consumer content for all products in this group, except for coated papers which may be 10% post-consumer content
- printed materials – minimum 30% post-consumer content, except for coated papers which may be 10% post-consumer content; printers must comply with all applicable federal, state and local environmental laws and regulations; printing facilities located in Massachusetts must also comply with the requirements of DEP's Environmental Results Program (www.mass.gov/dep/erp/about.htm).
- file folders – minimum 10% post-consumer content
- writing tablets, message pads and all other office paper – minimum 20% post-consumer content
- corrugated cardboard boxes – minimum 35% post-consumer content

Janitorial Products

- janitorial cleaning products – minimum specifications require that these products are third-party certified as Institutional and Industrial Cleaning Products by either Green Seal or

EcoLogo as directed in Executive Order #515

- janitorial cleaning services – all companies must use products that are third-party certified as Institutional and Industrial Cleaning Products by either Green Seal or EcoLogo as directed in Executive Order #515
- paper towels – minimum 100% total recycled content, 40% post-consumer content
- toilet tissue – minimum 100% total recycled content, 20% post-consumer content
- facial tissue – minimum 100% total recycled content, 10% post-consumer content
- napkins – minimum 100% total recycled content, 30% post-consumer content
- paper wipes, disposable – 50% post-consumer content
- wiping rags, cotton – 100% reused cotton
- plastic trash bags – minimum of 10% post-consumer content
- janitorial paper products as part of cleaning service contract – specifications as listed above

Automotive Products

- anti-freeze – minimum 100% recycled ethylene glycol or 100% propylene glycol
- re-refined motor oil – minimum 75% re-refined base stock; must be certified by the American Petroleum Institute (API)
- traffic cones – 50% total recovered PVC or Low Density Polyethylene (LDPE) or crumb rubber material, 8% post-consumer content
- glass beads – 100% total recycled glass

Flooring and Facilities/Recreational Products

- carpeting/broadloom and tiles – minimum 10% total recycled content (post/pre-consumer mix) by weight, with preference for styles made with the greatest percentage of post-consumer content; all carpet products must also be recycled unless the department can verify in writing that the condition of the carpet (e.g. contamination) prohibits recycling
- compost bins, plastic – minimum 50% post-consumer content
- Electrical supplies, equipment, devices, lamps and ballasts – energy efficient lighting, ballasts, exit signs, office equipment and more in compliance with Executive Order #484; such items must also be recycled or reused (as appropriate) through available statewide contracts
- fuels/vehicle use – ultra-low sulfur diesel and bio-diesel (low emission/low particulate matter) where applicable
- rubber matting and flooring – 80% post-consumer content
- office waste and recycling containers – 20% post-consumer plastic or 25% post-consumer steel
- plastic lumber benches, tables, dimensional lumber, site amenities – minimum 25-100% post-consumer recycled plastic (see contract for specifics)
- recycling carts, plastic – minimum 20% post-consumer content
- recycling set out containers, plastic – minimum 75% recycled plastic (50% post-consumer content)

In addition, WSU shall ensure that they integrate increased recycling practices in the disposal of their own waste materials, including but not limited to paper, glass, cans, plastic bottles, containers, and electronic equipment.

3.5 Sustainable Materials

In compliance with Massachusetts Executive Order 484, at WSU all new construction and significant renovation projects over 20,000 square feet will at a minimum meet the Massachusetts LEED Plus building standards. In addition, purchases of products shall be consistent with the LEED Materials and Resources section and the MA EO 515.

The LEED Plus building standards include:

- Certification by the U.S. Green Building Council Leadership in Energy and Environmental Design (LEED) program for all new construction and major renovation projects over 20,000 square feet;
- Energy Performance 20% better than the Massachusetts Energy Code;
- Independent 3rd party commissioning;
- Reduction of outdoor water consumption by 50% and indoor water consumption by 20% relative to standard baseline projections; and
- Conformance with at least 1 of 4 identified smart growth criteria.

At a minimum, WSU shall seek to maximize the amount of sustainable building materials purchased which meets these criteria:

- Materials were extracted, harvested or manufactured locally (within 500 miles);
- Materials are rapidly renewable;
- Materials are recycled (10-20% recycled content);
- Wood based materials meet LEED referenced sustainable wood certification;
- Materials are re-used or salvaged.

In addition, WSU shall prioritize the procurement of goods that are grown, manufactured, transported, and handled in a sustainable manner using, to the greatest extent feasible, a life-cycle analysis of materials and other inputs into the production of the final product. Such goods shall include, but not be limited to:

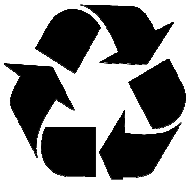
- Organic and locally grown foods;
- Compostable food service products;
- Bio-based products such as lubricants, food-service ware, fuels, plastics and coatings.

4.0 Contract Language

To ensure the highest quality and consistent environmental procurement across the University, WSU should include requirements from the State's Executive Order No. 515 and Executive Order No. 484 in contract documents pertaining to services for commodities solicited. Worcester State University should maximize the use of pre-approved Statewide Contracts as they already comply with these Executive Orders. If a deviation from the statewide contract is necessitated, and procurement is through Massachusetts Higher Education Consortium (MHEC) or by an individual

WSU Department Contract, the contract must have added language to comply with the specifications and guidelines established by Operational Services Division (OSD) and the EPP Program or other WSU policy. See

In any Invitation to Bid, Bid Packages, Request for Proposal/Purchase (RFP), Request for Qualifications (RFQ), or university contract pertaining to services or commodities solicited, respondents will be required to provide information on availability, pricing and familiarity with EPP's (or how they comply with related policies). For the latest information a vendor will be referred to the EPP website www.mass.gov/epp.



Definitions

Include These in Your Bid Language to Clarify Environmental Specifications

Environmentally Preferable Product (EPP) - A product or service that has a lesser or reduced effect on human health and the environment when compared with competing products or services that serve the same purpose. Such products or services may include, but are not limited to, those which contain recycled content, minimize waste, conserve energy or water, and reduce the amount of toxics either disposed of or consumed.

Energy Star is a Federal standard applied to office equipment for the purpose of rating the energy efficiency of the equipment. Energy Star computers, monitors, and printers save energy by powering down and going to "sleep" when not in use, resulting in a reduction in electrical bills and pollution levels.

MBE – a Minority Business Enterprise certified by the State Office of Minority and Women Business Assistance (SOWMBA).

Post-consumer Content - Products generated by a business or consumer which have served their intended end uses, and which have been separated or diverted from solid waste for the purpose of collection, recycling and disposition.

Pre-consumer Materials (also known as Post-Industrial) are generated by manufacturers and product converters. Instead of being trashed, the materials such as trimmings, damaged or obsolete products or overruns are collected and incorporated into a manufacturing process.

Price Preference - When a government agency, municipality or department, or any other entity is willing to pay a higher price (usually 5 - 10%) for recycled or environmentally preferable products.

Recycled Products means goods which contain materials which have been diverted from the solid waste stream, including post-consumer materials, and materials and/or by-products generated in industrial processes, or which have been wholly or partially remanufactured.

Recovered Materials are waste materials and byproducts which have been recovered or diverted from solid waste, including post-consumer materials and materials generated in industrial processes.

Remanufactured Products are those products or equipment partially or fully manufactured from existing product materials where such materials are cleaned and repaired to the extent possible and reused in the new product or equipment. All unusable parts are to be removed and replaced with new or remanufactured parts which meet OEM standards.

Recyclability - The ability of a product or material to be recovered from or otherwise diverted from the solid waste stream for the purpose of recycling.

"Unreasonable Price" - Prices for recycled paper goods may be considered "unreasonable" if the cost is greater than 10% of the lowest responsive virgin material bid. However, for other products, please remember that purchasers should consider the cost of maintenance, frequency of replacement and disposal costs, in addition to the purchase price, to get the "true" or "life-cycle" cost of a product.

WBE – a Women's Business Enterprise certified by the State Office of Minority and Women Business Assistance (SOWMBA).

W/MBA – a Minority and Women's Business Enterprise certified by the State Office of Minority and Women Business Assistance (SOWMBA).