

Wright State University Student Government



Sustainability Proposal



Executive Summary

1. What is sustainability and why is it important?

- a. Meet contemporary needs without compromising the ability of future stakeholders to satisfy those needs
- b. Reduced costs, lowered environmental impact, and improves the lives of people in the community and the world
- c. Appeals to Wright State's mission and social responsibilities of being a university

2. Overview of ways to save

- a. Vending machine modifications
 - i. Installation of motion sensors and more sensitive temperature sensors
 - ii. Savings of \$192 / year / machine
- b. Cool roof system
 - i. Light-colored commercial roofing system that reflect the sun's heat and damaging rays and readily emits any absorbed solar heat.
 - ii. Reduces cooling energy demands by up to 50% per building
- c. Green roof system
 - i. Protects roof membrane resulting in a longer material lifespan (up to twice as long as conventional roofs)
 - ii. 25% reduction in summer cooling needs
 - iii. Reduced heat gains by 95% and heat losses by 26% compared to a conventional roof
 - iv. Reduction of storm water run off
 - v. Sound reduction
- d. Default margins of printed papers
 - i. Reduce margins to $\frac{3}{4}$ of an inch
 - ii. A Penn State study showed that \$100,000 per year could be saved on purchase and disposal costs if margins were reduced
- e. Printers with double-sided printing capabilities
 - i. Has the potential to reduce printing costs by up to 50%
- f. Water conservation techniques and technology
 - i. Ultra low-flush toilets that deliver 1.6 gallons per flush would reduce water usage by 65% when compared to conventional toilets

3. Action Plan: Please refer to page 9

4. Resources: Please refer to page 10



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What is sustainability and why is it important?

Sustainability can be defined simply as meeting contemporary needs without compromising the ability of future stakeholders to satisfy those needs.

Sustainable practice can reduce costs, lower environmental impact, and improve the lives of people in the community and the world. Problems such as climate change, acid rain, deforestation, species extinction, fisheries depletion, soil erosion, all forms of pollution, and ozone depletion can be lessened by the implementation of sustainable practices.

Sustainable practices are already the “norm” for many universities, businesses, and organizations across the country. For example, Harvard University’s “Green Campus Campaign” has led to a reduction of 11 million pounds of carbon dioxide per year since its implementation in 2000. Moreover, the university has reduced its water usage by 5 million gallons and its production of solid waste by 200,000 pounds per year. Economically, the “Green Campus Campaign,” funded by state, federal, and private grants, has saved Harvard University over \$1 million dollars since the project since it began.

In addition to Harvard’s efforts, Tufts University and Medford University have also been practicing sustainability. They replaced incandescent bulbs with compact fluorescent bulbs throughout their campuses which cut lighting costs in half.

As Tufts and Medford have shown, sustainable practices are not difficult to implement. Wright State can save money and improve the environment by making small, relatively simple changes included within this document or at the recommendation of various websites included in the resource section of this document. These sustainable efforts can lower university expenses and provide opportunities for Wright State to secure research funding and philanthropic support. Universities that have successful and well published efforts on sustainability receive positive media attention on the internet and in the surrounding community.

Wright State could save money, improve the environment, and generate a new recruiting tool just by making some of these small yet highly effective changes.



Potential Sustainable Efforts

Computer Management: Most computers have energy saving features (power management) that can be activated.

- **Monitor Power Management (MPM)** can save \$10 to \$30 per monitor annually by placing your inactive monitors into a low-power sleep mode.
- **Computer Power Management (CPM)** places inactive computers (CPU, hard drive, etc.) into a low-power sleep mode, which can save \$15 to \$45 per desktop computer annually.
- **Computer Monitors** CRT monitors are being more and more frequently replaced with LCD monitors. These use only about a third the energy of a CRT (ca. 25W instead of 75W)

Fume Hoods (energy-efficiency in laboratories): Low Flow Fume Hoods are more expensive than conventional hoods; however, their energy-savings justify the higher up-front costs.

- U.S. Department of Energy's Lawrence Berkeley National Laboratory reduces energy use by 50 percent or more.
- Annual electricity savings per hood is about \$1,000 (close to 8,500 kWh saved per hood).

Lighting Upgrades & Motion Sensors: Ensures that lights are turned off when they're not in use. The potential energy and carbon savings of shutting off lights at nights and during weekends and long breaks can become quite significant.

- Minimizes lighting overuse and achieves 50% energy savings.
- Operation & maintenance cuts O&M costs by 33% by reducing lighting use, resulting in extended lamp life.

Changing the Default Margins on Papers

- Penn State conducted a study that demonstrated that over \$100,000 per year could be saved in purchase and disposal costs of paper if the default margins on university computers were simply reduced to 3/4 of an inch.

Purchase Printers That Have Double-Sided "Duplex" Printing Capability

- Saves money and natural resources
- Dr. Wangari Maathi

Postconsumer Recycled Paper:

By using 30% postconsumer recycled copy paper, Citigroup annually conserves an estimated:

- 33 billion BTUs of energy
- 2,000 tons of greenhouse gases
- 19 million gallons of wastewater
- 6,700 tons of wood
- 1,000 tons of solid waste



Compact Florescent Lighting (CFL)

- Energy saving of 60% to 75% per CFL

	Compact Florescent Light	Incandescent Bulb
Energy Input	13 watts	60 watts
Life (hours)	10,000	1,000
Light Output	810 – 830 lumens	830 – 850 lumens
Bulb Cost	\$1.98	\$0.50
Electricity Used	130 kWh	600 kWh (kilowatt hours)
Electricity Cost @ \$0.08 per kWh	\$10.40	\$48.00

*Table from Georgia Interfaith Power & Light

Vending Machines Modifications

- Modification to use motion sensors and more in depth temperature sensors which can achieve energy savings.
- The estimated savings from one machine is approximately \$192/year.
- Savings are likely to be even higher because the annual calculation assumes that the university is occupied and at full operations throughout the year.

Cool Roof System

- A light-colored commercial roofing system that reflects the sun’s heat and damaging rays and readily emits any absorbed solar heat.
- Studies show reduced cooling energy demand in buildings by up to 50%.

Green Roof System

- Protection of roof membrane resulting in a longer material lifespan (it is estimated that green roofs will last up to twice as long as conventional roofs).
- Savings on energy heating and cooling costs, depending on the size of the building, climate, and type of green roof.
- Some buildings energy savings
 - 25% reduction in summer cooling needs.
 - Reduced heat gains by 95% and heat losses by 26% compared to a traditional roof.
 - Reduction of storm water run-off.
 - Sound reduction.

Air Quality Improvement

- Lawn mowers
 - The Air Resources Board of the California EPA reports that a single lawnmower emits the equivalent of 40 new automobiles of CO2 operating for one hour (non-CO2 air -pollutants; CO2 emissions are small).



Alternative Fuels:

- Electric vehicles.
- Hybrid vehicles.
- Compressed Natural Gas.
- Bio-Diesel and Ethanol.

Water Conservation Methods

Water Conservation Comparison			
Energy Efficient Fixtures		Older Inefficient Fixtures	
Sink Faucet	2.2 gpm or less	Sink Faucet	4-6 gpm
Toilet	1.6 gpf or less	Toilet	3.5 to 5 gpf
Showerhead	2.5 gpm or less	Showerhead	4-7 gpm
Average water use is 51.9 gallons per person, per day		Average water use is 74 gallons per person, per day	
A family of four could save 31,500 gallons per year! Imagine what an entire university could do!			

With average water costs of \$0.0021 per gallon and wastewater costs of \$0.00235 per gallon, this would be a cost savings of over \$140 per year not including heating, electricity and other associated costs.

Low-Flush Toilets

The ultra-low-flush toilets considered were rated to deliver approximately 1.6 gallons per flush, corresponding to a potential 65 percent savings from the 4.5 gallon volume measured for the conventional toilet.

Low Flow Sink and Shower Faucets

Faucet aerators replace the faucet head screen, lowering the flow by adding air to the spray.

Turf Block for Fire and Emergency Lanes

- Reduces impervious surfaces.
- Reduced volume and velocity of runoff.
- Withstands 76,000 pounds.

Reduction of Impervious Surface and Water Run Off

- Pervious Pavement
 - Pervious pavement is a unique cement-based concrete product that has a porous structure that allows rainwater to pass directly through the pavement and into the soil naturally. This is achieved without compromising the strength, durability, or integrity of the concrete structure itself.



Other Energy Saving Investments

- Solar hot water system with BTU meter.
- GFX heat exchanger with BTU meter.
- Connect existing hot water tanks and solar tank as a zone off of the boiler.
- Solar panel installation.

Education

- Develop an environmental education program that will engage students, faculty, and staff in understanding and implementing resource conservation strategies.
 - Incorporation with UVC classes, and professional development programs
- Web Site: A Web site should be constructed to give detailed environmental information and management strategies pertinent to the campus community. Monitoring data and other collection information could also be displayed here.
- Brochure: A brochure with pertinent information on sustainability and how they can participate could be given to all incoming students, returning students, or at popular university events.



Action Plan

Sustainability Committee Action Plan:

- Create a university committee, either presidential task-force or permanent Faculty-Senate committee, to:
 - Conduct a comprehensive assessment of WSU's environmental and sustainability efforts to reduce redundancy, improve efficiency, and better understand areas for improvement
 - Recommend a prioritized plan - Sustainability Action Plan - to lower WSU's environmental impact, reduce university operating cost, and save money.
 - Engage students, faculty, staff, and especially administration in the full implementation of the action plan through the gradual achievement of reasonable, practical, and cost-effective goals and benchmarks over a 5-10 year period
 - Identify and publicize sustainability-program and the importance of practicing environmental friendly practices
 - Encourage schools and colleges to incorporate sustainability into core curriculum
 - Ensure that environmental, social, and economic implications are considered prior to the university actions
 - Consider adopting USGBC's LEED standard for new construction
 - Involvement with university bid processes to ensure that companies and organizations meet WSU's sustainability standards
 - Implement and support a university-wide reduce, reuse, and recycle program

What WSU Should Consider:

- Facility Design
 - Energy Conservation
 - Indoor Air Quality
 - Selection of Materials
 - Construction Methods
 - Guidelines & Standards
- Operations
 - Energy Management
 - Alternative Fuels
 - Reduce/Reuse/Recycle
 - Thoughtful Renovation
- Landscape Design & Management
 - Native Vegetation
 - Increased Tree Canopy
 - Reduced Impervious Surface
 - Performance Landscapes
 - Storm Water Management
- Publicity
 - Education of Students, Faculty and Staff
 - Community effort Coordination



Resources

1. Climate Action Toolkit: This is a comprehensive guide about making a campus green. Ranging from programs related to renewable energy, transportation, energy efficiency, recycling, and dining services, this site offers detailed resources about each subject area, along with numerous links to examples successful college programs.
<http://www.cleanair-coolplanet.org/toolkit/content/view/30/126/>
2. Recycling and Beyond, A College Campus Primer: This resource primarily focuses on recycling, and has excellent ideas regarding the set up of an effective program, as well as useful ideas for promotion of the program.
<http://www.uoregon.edu/%7Erecycle/Book/index.htm>
3. Appropedia: An interesting website which gathers grassroots sustainability efforts which include programs, projects, thesis, and how-tos in the attempt to share best practices for a more sustainable world.
http://www.appropedia.org/Welcome_to_Appropedia
4. Wikipedia Article on Sustainability: Contains good information about sustainability and large variety sustainability websites.
<http://en.wikipedia.org/wiki/Sustainability>