

Sustainability Audit Report

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Space/Date Audited: OSU Foundation Building, 6/17/09

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This report contains observations of the OSU Foundation building and recommendations to enable building occupants to make their workspace and processes more sustainable. These recommendations aim to respect the unique nature of each space while encouraging occupants to make changes that will reduce environmental impacts.

If you have any questions or comments regarding the format, observations or recommendations of this energy audit, do not hesitate to write or call: sustainability@oregonstate.edu or 737-3307. Other staff or departments interested in receiving a Sustainability Audit are also welcome to contact the email and phone number listed above. Thank you for your time and participation.

Recommendation Summary

Table 1: Recommended and Potential Energy Conservation Measures				
Conservation Measure	Annual Energy Savings (est.)	Annual Savings (est.)	Implementation Cost (est.)	Return on Investment
Install occupancy sensor to reduce lighting hours. Estimated impact is 16 fixtures in student call center.	648 kWh	\$30.85	\$99.84	3.24
Enable standby modes on computers that typically run during working hours; estimated impact is 71 computers.	3,540 kWh	\$177.00	\$0.00	Immediate
Turn off or standby computers at night that typically run 24/7; estimated impact is 59 computers	38,409 kWh	\$1,920.45	\$0.00	Immediate
Turn off all printers at night that typically run 24/7; estimated impact is 14 printers/copiers	3,457 kWh	\$172.84	\$0.00	Immediate

Turn off electrical lighting in areas where natural lighting is sufficient	5,415 kWh	\$270.75	\$0.00	Immediate
Unplug (or switch-off using a surge protector) all small office equipment (cell phone chargers, computer accessories, etc.) at night and when not in use	684 kWh	\$34.18	Avg. \$3/power strip;	1.02
			\$35 total	
Total savings if above changes are implemented	52,152 kWh	\$2,606.07	\$134.84	0.05

By implementing the changes listed above 105,348 lbs of CO₂¹, 678 lbs of SO₂² and 355 lbs of NO_x² will not be emitted into the environment each year.

1- PacifiCorp; 2 - Phil Carver, Oregon Department of Energy

Conservation Measure	Annual Water Savings (est.)	Annual Cost Savings (est.)	Implementation Cost (est.)	Return on Investment (years)
Install aerators on all bathroom faucets with a flow rate of more than 1 gpm (estimated impact is 18 faucets)	356,632 gallons	\$1,890.15	\$121.50	0.06

Lighting

Observations:

- Typical fixture is a recessed 2 lamp T8 fluorescent with opaque, shield-type diffuser
- Lights were usually off in unoccupied offices
- Excessive lighting throughout commons areas

Table 3: Lighting Energy Usage			
Fixture Type	Quantity	Energy use per fixture (Watts)	Watts per fixture type
1 lamp-T12	16	40	640
3 lamp-T8	16	96	1536
2 lamp-T8	312	64	19968
1 lamp-T8	35	32	1120
40W incandescent	7	40	280
18W CFL	11	18	198
13W CFL	25	13	325
		Total	24067

Recommendations:

- **Replace all incandescent and halogen lamps with compact fluorescent (CFL) lamps.** CFLs produce light much more efficiently than incandescent and halogen lamps. CFLs also produce less heat, an important factor to consider during the summer months. CFLs come in a wide-range of spectra and intensities, so a suitable CFL can be found for almost any application. As part of the audit process, the Sustainability Office will distribute CFLs to building occupants. If you would like a CFL and have not yet received one, please contact [us](#).
- **Report instances of improperly-timed outdoor lighting.** Outdoor lighting is usually controlled by either timers or photosensors. If these controllers fail, the lighting will remain on even if daylight provides sufficient illumination. If you notice outdoor lighting that is improperly timed please contact the [Sustainability Office](#).
- **Request motion-activated occupancy sensors in student call center.** These types of sensors are efficient and easy to install. They automatically turn off the lights if no motion is detected within a specified period of time. Detailed recommendations for other specific spaces can be provided upon request.
- **Request delamping for areas that are overlit** or areas where natural or task lighting provides sufficient illumination. Please email sustainability@oregonstate.edu for more information on delamping procedures.
- **Utilize natural lighting wherever possible.** In many cases, natural lighting provides sufficient illumination for a variety of tasks. In locations where windows allow for enough light to enter the work areas, turn off lighting as it is not needed. Also, by arranging spaces and furniture throughout the building in a way that utilizes natural light to the maximum possible extent, electric lighting use is decreased and occupants achieve superior lighting levels and consistency. If necessary, use task lighting to supplement natural lighting.
- **Request replacement or delamping of burnt-out fluorescent lamps.** Unlike incandescent lamps, burnt-out fluorescents still consume energy. If the light level in the area is adequate without the lamp lit, please email sustainability@oregonstate.edu for more information on delamping procedures. If the lamp has been out for more than two weeks and needs to be replaced, contact Facilities Services by email at FacilitiesCustomerServ@oregonstate.edu or by phone at 7-2969. Notes on specific areas with burnt-out lamps are available upon request.

Computers and peripherals:

Observations:

- Some computers and monitors were observed on in unoccupied spaces
- A large percentage of printers had standby modes enabled
- Most computer peripherals (speakers, external hard drives, etc.) were off in unoccupied areas

Table 4: Office Equipment Energy Usage					
Equipment	Quantity	Energy consumption active (est.)	Energy consumption standby/sleep (est.)	Energy consumption off (est.)	Total (Watts w/ units on)
Computer	118	65W	2W	0W	7670
Liquid crystal display (LCD) monitor	125	35W	2W	0W	4375
Laptops	23	15W	1W	1W	345
Misc. printer/copier/fax (ave.)	14	830W	38W	0.5W	11620
Total (Watts)					24010

Recommendations:

- **Turn off or standby computers at night** and have them enter standby when not in use for extended periods of time (30 minutes or longer). Standby or shut off monitors that have been inactive for 10 minutes.
 - On most computers, power management options can be found under the Control Panel (from Start → Settings → Control Panel). Click 'Power Options'. Here you can designate when your monitor or computer should enter standby.
 - Turning a computer on and off does not damage its hardware like it once did. Most hard disks are rated at 20,000 on/off cycles. If turned on/off once a day, it would take 55 years to reach this rating number.
- **Turn off printers at night (especially laser printers)** that typically are on all day. Laser printers consume considerable amounts of energy even while in standby mode; according to manufacturer's specifications, several laser printers inventoried during the audit consume over 45W while in standby! The average standby power draw is 38W. If high volume printing is not necessary, recommend that staff use inkjet printers, which typically use considerably less energy (<5W) when in standby.

- **Use a surge protector for computer peripherals and other accessories.** While many computer peripherals like speakers, scanners and external hard drives do not use very much energy (<5W), the accumulated energy consumption is significant. By having them all plugged in to a surge protector, not only are they protected from fluctuations in current, they also can be easily shut off at night or during extended periods of downtime.
- **Use laptops in place of desktops when appropriate.** Laptops use considerably less energy than a desktop (20-30 W vs. 100-150 W) and do not require an uninterruptible power supply. A laptop docking station allows for desktop-like function while at work or at home while allowing the full portability required of a laptop.
- **Decrease time at which copiers and printer enters power-save mode to 15 minutes.**

Other Electrical Equipment

Observations:

- 3 small refrigerators and 2 regular size refrigerators were observed
- 2 TVs and 2 microwaves were noted

Recommendations:

- **Plug accessories into a surge protector** so they can be easily shut off at night and on weekends. Many of the accessories listed above require a constant power supply to power displays and maintain system functions. While this phantom load is usually small for an individual piece of equipment, the aggregate power consumption can be surprising. A surge protector is a safe and convenient way to protect these devices while allowing the user a fast and simple way to shut them off when they are not in use.
- **Consolidate contents of seldom-used refrigerators to reduce the number of total refrigerators.** Small ‘mini’ refrigerators use between 200 to 300 kWh annually. A new, full-sized refrigerator uses only 600 kWh to cool a volume many times greater.
- **Tips for efficient refrigerator and freezer use:**
 - Keep fridges 2” away from the wall and clean coils every 6 months
 - Clean or replace gaskets on doors to maintain an effective seal
 - Set refrigerator temperature to 40°F and freezer to 0°F
 - Fill empty space with jugs of water in the fridge and blocks of ice in the freezer. This minimizes the cooling loss of opening the fridge or freezer door.

Recycling

Observations:

- Paper and commingled recycling bins were present in various locations around the area

Recommendations:

- **Ensure enough recycling bins are located to be convenient for all office occupants.** Ideally, a commingled recycle bin would be adjacent to every trashcan in a common area. For more information on recycling, please visit the Campus Recycling website at <http://recycle.oregonstate.edu/> or contact them [via email](#).

Other Notes:

- If your office space generates electronic waste, **consider participating in a new electronic media recycling program offered by Campus Recycling.** Items such as CDs, CD cases, 3.5" floppy discs, and audio/visual tapes are accepted. For more information on this program, contact the [Sustainability Office](#).

Purchasing

Recommendations:

- **Consider Energy Star® products when replacing appliances and office equipment.** These products are typically 10-30% more efficient than non-rated models and the purchase price difference is oftentimes negligible.
- **Consider EPEAT™ -certified computers and accessories** when purchasing new equipment. EPEAT™ evaluates products on a wide-range of environmental criteria, ranging from energy consumption and materials to toxic content and end-of-life management.

Paper Use

Observations:

- Approximately 400 reams of virgin paper are used annually

Recommendations:

- **On all computers, set double-sided printing as the default setting for printers with this capability.**
- **Encourage printing on clean side of single-sided paper.** Add small boxes near printers containing this draft paper or leave a stack of this paper in printer bypass feeders.
- **Consider purchasing recycled paper with a high post-consumer content (50%+)** for your space. Recycled paper is compatible with all printers and costs only slightly (15%) more than virgin material, while significantly reducing the environmental impacts of printing.

Heating & Cooling

Observations:

- 13 personal heating devices were observed

Recommendations:

- **Consider alternatives to forced air space heaters.** While effective in small, well-insulated spaces with low ceilings, forced air space heaters are inefficient in areas where the warm air can easily escape or rise above the occupied zone. Alternatives allow for equal comfort while using significantly less energy. Radiant heaters use 100-200W, compared to 1500W for forced air heaters, and users report increased comfort at lower air temperatures. Radiant heaters are also preferred from a fire safety standpoint.
- **Try these energy-saving tips to keep yourself comfortable:**
 - Dress appropriately for the weather: wear light, breathable clothing in summer and layer clothing during the winter
 - Use fans instead of AC units, and radiant heaters (which heat you and not the air) instead of space heaters
 - Close shades or blinds during hot days (keeps heat out) and on cold nights (keeps heat in)
- **In winter, limit air infiltration with a draft stopper.** There are many different options, but a simple and inexpensive solution is to use a towel or a window 'sock' to block air from entering the space.

Water Conservation

Observations:

- All hand washing sinks lacked aerators that limited flow to <1.0 gallons per minute (gpm), an accepted industry standard.

Recommendations:

- **Request aerators to limit flow on hand washing sinks to 1.0 gpm maximum.** Unless a sink is used for filling, 1.0 gpm is an adequate amount of water for hand washing while conserving water.
- **Report leaking faucets** to the [Sustainability Office](#). A leaking faucet with 30 drips per minute can waste over a thousand gallons of water per year.