

# Sustainability Audit Report

Space/Date Audited: **Wilkinson Hall**, 11/5/09

Submitted: November 24, 2009

Audit performed by: Dustin Quandt

Building contact: Steve Cook

This report contains observations of Wilkinson Hall 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](mailto: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

<b>Table 1: Recommended Energy Conservation Measures</b>				
<b>Conservation Measure</b>	<b>Annual Energy Savings (est.)</b>	<b>Annual Savings (est.)</b>	<b>Implementation Cost (est.)</b>	<b>Return on Investment</b>
Replace all incandescent lights with CFLs. Estimated impact is 13 lamps.	2,749.5 kWh	\$130.91	\$106.00	0.8
Replace T12 fixtures with T8 fixtures	130,000 kWh	\$6,500.00	\$51,250.00	7.9
Install occupancy sensor to reduce lighting hours (Room 127). Estimated impact is 9 fixtures.	2,859.8 kWh	\$136.16	\$200.87	1.5
Install occupancy sensor to reduce lighting hours (Room 210). Estimated impact is 16 fixtures.	5,904 kWh	\$45.00	\$270.00	5.9
Enable standby modes on computers that typically run during working hours; estimated impact is 82 computers.	4,110 kWh	\$205.50	\$0.00	Immediate
Turn off or standby computers at night that typically run 24/7; estimated impact is 69 computers	4,4594 kWh	\$2,229.68	\$0.00	Immediate
Turn off all printers at night that typically run 24/7; estimated impact is 12 printers/copiers. Enable standby modes.	1,442 kWh	\$72.10	\$0.00	Immediate
<b>Total savings if above changes are implemented</b>	<b>191,659 kWh</b>	<b>\$9,555.45</b>	<b>\$51,787.69</b>	<b>5.42</b>

**By implementing the changes listed above 311,880 lbs of CO<sub>2</sub><sup>1</sup>, 2,007 lbs of SO<sub>2</sub><sup>2</sup> and 1,050 lbs of NO<sub>x</sub><sup>2</sup> will not be emitted into the environment each year.**

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

In addition to the savings in the table above, an estimated **46,800** gallons of water (**\$248.04**) can be saved per year by installing aerators on all bathroom faucets. Estimated impact is 6 faucets.

### Lighting

Observations:

- Typical fixture is a 2 lamp T12 fluorescent, recessed with opaque, shield-type diffuser
- Lights were usually off in unoccupied areas
- Some lamps were burnt out

<b>Table 2: Lighting Energy Usage</b>			
<b>Fixture Type</b>	<b>Quantity</b>	<b>Energy use per fixture (Watts)</b>	<b>Energy use per fixture type (Watts)</b>
4 lamp T12	93	160	14880
3 lamp T12	36	120	4320
2 lamp T12	513	80	41040
1 lamp T12	41	40	1640
4 lamp T8	2	128	256
3 lamp T8	6	96	576
2 lamp T8	57	64	3648
60W incandescent	12	60	720
40W incandescent	1	40	40
3 stage floor lamp	1	80	80
<b>Total</b>			<b>67200</b>

Recommendations:

- **Replace all incandescent lamps with compact fluorescent lamps (CFL).** 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 can distribute CFLs to building occupants who ask for them. If you would like a CFL and have not yet received one, please contact [us](#).
- **Replace all T12 fixtures with twin or single lamp T8 fixtures.** T8 lamps have a higher efficacy (light output per watt) than T12's so the same level of light can be maintained while using fewer fixtures and lamps. It is a goal of Facilities Services to replace all T12 lamps on campus, however, due to the quantity of T12's, this will be a long process. If a department is eager to replace inefficient lighting, and is willing to participate in a cost-sharing mechanism, certain areas can become a priority. Please contact the [Sustainability Office](#) for more information.

- **Report instances of improperly-timed outdoor lighting.** Outdoor lighting is usually controlled by either timers or photosensors. If these controls fail, lighting will remain on even if natural light provides sufficient illumination. If you notice outdoor lighting that is improperly timed please contact the [Sustainability Office](#).
- **Request occupancy sensors in common areas such as restrooms, kitchens and copy rooms where lights are typically left on.** 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 specific spaces can be provided upon request. Also available are manually-activated switches that have a multi-option timer so lights go out after the specified amount of time. These timer switches are ideal for rooms with windows where electrical lighting may not be necessary during the day. See recommendation for rooms 210 and 127 in Table 1.
- **Request delamping for areas that are overlit** or areas where natural or task lighting provides sufficient illumination. Please email [sustainability@oregonstate.edu](mailto: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](mailto: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](mailto:FacilitiesCustomerServ@oregonstate.edu) or by phone at 7-2969. Notes on specific areas in your building with burnt-out lamps are available upon request.

### Computers and peripherals:

#### Observations:

- Few computers and monitors were observed on in unoccupied spaces
- A large percentage of printers did not have standby modes enabled

Equipment	Quantity	Energy consumption active (est.)	Energy consumption standby/sleep (est.)	Energy consumption off (est.)	Total (Watts w/ units on)
Computer	137	65W	2W	0W	8,905
Liquid crystal display (LCD) monitor	123	35W	2W	0W	4,305
Cathode Ray Tube screens (CRT)	26	60W	2-45W	0W	1,560
Laptops	34	15W	1W	1W	510
Misc. printer/copier/fax (ave.)	19	486W	534W	5W	9,225
				Total	24,505W

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.
- **Manually turn off cathode-ray tube (CRT) monitors at night** or during prolonged downtime (10 minutes or longer). Older (pre-1995) CRTs consume considerable energy even while in standby or sleep modes. In one case, we measured a 17" CRT using 58W while on and 45W in standby. Turning them off (using the hard switch) guarantees that these monitors are not drawing a large phantom load.
- **Purchase liquid crystal display (LCD) monitors** when replacing CRT monitors or for new workstations. LCDs use considerably less energy and cause less eye strain, and their slimmer profile increases useable workspace. Consider **EPEAT™** or Energy Star® certified products (<http://www.epeat.net/>, <http://www.energystar.gov/>) which meet stringent energy-saving and environmental criteria. .
- **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, some laser printers inventoried during the audit consume over 120W while in standby! The average standby power draw is 28W. If high volume printing is not

necessary, recommend that staff use inkjet printers, which typically use considerably less energy (<5W) when in standby.

- **Consolidate printers and copiers with help from Printing and Mailing Services.** Printing and Mailing offers a new service starting in 2009 to assist departments in measuring costs associated with printers and copiers and financial savings from device consolidation. Contact [Cheryl Lyons](#) for more information or to schedule a free assessment. Several OSU departments have realized significant savings from consolidation.
- **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:

- 6 small refrigerators and 6 regular size refrigerators were observed
- 6 microwaves were also 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.
- **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](#).

### Additional 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 [Campus Recycling](#).

## 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

### 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.
- **Contact Printing and Mailing Services for a free assessment of printer and copier settings and options.** More details in Computers and Peripherals section above.

## Heating & Cooling

### Observations:

- Very few occupants in desk and office spaces used small space heaters.

### 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. Other options like interior storm windows are available. [Contact us](#) for more info.

## Water Conservation

### Observations:

- No hand washing sinks had aerators

### Recommendations:

- **Request aerators to limit flow on hand washing sinks to 1.0 gpm.** 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.