

# Sustainability Audit Report

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Space/Date Audited: Cascade Hall/November 11, 2008

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and Mary Stanley-Art

## Lighting

Lighting Energy Usage			
Fixture Type	Quantity	Energy use per fixture	Watts per fixture type
4 lamp T12	18	164W	2952
3 lamp T12	3	123W	369
2 lamp T12	65	82W	5330
4 lamp T8	124	96W	11904
3 lamp T8	50	72W	3600
2 lamp T8	23	48W	1104
150 W incandescent	61	150W	9150

### Observations:

- Typical fixtures are 4 lamp T8 fluorescent hanging in Printing & Mailing, 2 lamp T8 and T12 fluorescent recessed with opaque shield type diffusers in Public Safety, and 4 lamp T12 fluorescent with incandescent spots in the Art section.
- Lights were mostly off in unoccupied areas.
- Some bulbs were out.

### Recommendations:

- **Replace incandescent and halogen bulbs with compact fluorescent (CFL) bulbs wherever possible.** CFLs produce light much more efficiently than incandescent and halogen bulbs. 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.
- **Replace all T-12 fixtures with twin or single T-8 fixtures.** T-8 lamps have a higher efficacy (light output per watt) than T-12s so the same level of light can be maintained while using fewer fixtures and bulbs.
- **Install motion-activated occupancy sensors in common areas such as restrooms and kitchen spaces.** 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.

- **Replace or remove burnt-out fluorescent lamps.** Unlike incandescent bulbs, 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 with burnt-out bulbs are available upon request.

### Computers and peripherals

Observations:

- Some computers, monitors, and printers were on in unoccupied spaces.
- Most computer peripherals (speakers, external hard drives etc) were on in unoccupied areas.

<b>Office Equipment Energy Usage</b>				
<b>Equipment</b>	<b>Quantity</b>	<b>Energy consumption on</b>	<b>Energy consumption standby/sleep</b>	<b>Energy consumption off</b>
Computer	60	65W	2W	0W
Liquid crystal display (LCD) monitor	68	35W	2W	0W
Cathode-ray tube (CRT) monitor	7	65W	up to 45W	0W

Recommendations:

- **Institute a power saving mode on all 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.
- **Turn off or standby computers at night** and have them enter standby when not in use for extended periods of time (one hour or longer).
  - 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 (20 minutes or longer). Older (pre-1995) CRTs consume considerable energy even while in standby or sleep modes. In one case, a 17" CRT was measured 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.
- **Replace older model cathode-ray tube (CRT) displays with liquid crystal displays (LCDs).** LCDs are more efficient and cause less eye strain. 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. If replacing the monitor is cost-prohibitive, make sure the monitor is manually turned off at night or when it will not be used for more than 20 minutes.
- **Turn off all printers each night.** Comparing the energy required for starting up a machine to that used when left on overnight shows that there are significant savings associated with turning the equipment off. Assuming a warm up time of 15 minutes at full power, the Xerox iGen3 110 alone could save over \$500 a year in energy costs. Turning off all printers that are currently left on overnight during the week could save more than \$1120.
- **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 full size, and 1 mini fridge were observed.
- 3 microwaves and 3 coffee pots were also noted.
- Approximately 40 miscellaneous chargers, radios, and other small pieces of equipment were observed.

#### 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.

- **Keep fridge at least one and a half inches away from the wall** (if possible) to allow for more efficient cooling. Placing a wood block on the floor behind the fridge would keep it from being pushed back against the wall. Also, regularly clean the refrigerator coils. This is another measure that can be undertaken every six months to increase efficiency.
- **Place jugs of water in fridge and blocks of ice in freezer** if units are consistently empty. Filling empty air space lessens the amount of warm air that needs to be cooled each time the fridge or freezer door opens.

## 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 contact [sustainability@oregonstate.edu](mailto:sustainability@oregonstate.edu).

### 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, please contact [sustainability@oregonstate.edu](mailto:sustainability@oregonstate.edu).

## 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.

## Heating & Cooling

### Observations:

- There appeared to be no insulation in the Printing & Mailing section or the first floor Art section.
- Printing & Mailing bay doors were used by staff, even when man doors would have easily sufficed.

### Recommendations:

- **Consider additional insulation.** This will create a more effective barrier between the heated areas and exterior. It may be possible to line the warehouse with fiberglass batts. For more information on insulation, please email [sustainability@oregonstate.edu](mailto:sustainability@oregonstate.edu).
- **Use bay doors only when necessary.** Leaving these large doors closed whenever feasible can have a large impact on temperature control costs.

## Recommendation Summary

Recommended Energy Conservation Measures and Potential Savings				
Conservation Measure	Annual Energy Savings	Annual Savings	Implementation Cost	Return on Investment
Replace all incandescent lights with CFLs. Estimated impact is 61 bulbs.	10,000 kWh	\$500	Avg. \$4/bulb; \$244 total	.5 years
Replace T12 fluorescent fixtures with newer T8s. Estimated impact is 86 fixtures.	13,850 kWh	\$692.5	Estimated \$15,480	23.5 years
Enable standby modes on computers that typically run all day; estimated impact is 60 computers.	2,500 kWh	\$125	\$0	Immediate
Turn off Printing & Mailing equipment at night is typically left powered on during the week; estimated impact is 4 printers.	22460 kWh	\$1123	\$0	Immediate
Unplug (or use surge protector switch-off) all small office equipment (chargers, computer accessories, radios, etc.) at night; estimated 40 pieces of equipment.	1750 kWh	\$87.5	Avg. \$3/power strip; Estimated \$120 total	1.4 years
<b>Total savings if above changes are implemented</b>	<b>50,560 kWh</b>	<b>\$2,528</b>	<b>\$15,824</b>	<b>6.3 years</b>

**By implementing the changes listed above 101,120 lbs of CO<sub>2</sub><sup>1</sup>, 128 lbs of SO<sub>2</sub><sup>2</sup> and 165 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

If you have any questions or comments regarding the format, observations or recommendations of this energy audit, do not hesitate to write or call. We can be reached at [sustainability@oregonstate.edu](mailto:sustainability@oregonstate.edu) or 7-3307. 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.

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