

Sustainability Audit Report

Audit performed by: _____ Greg Smith _____ **Date:** 5/7/07

Space Audited/Date Audited: _____ Kerr Administration / _____ 3-28-07

Feedback report to: Jeannie Davis 640 KAd; Janet Ekholm 100 KAd; Joy Jorgensen 110 KAd; Carol Spinney 640 KAd; Liz Newcombe 204 KAd;

Lighting:

Observations:

- Typical fixture is a 4 lamp T12 fluorescent, recessed with opaque, shield-type diffuser;
- Lights were usually off in unoccupied areas;

Fixture Type	Quantity	Energy use per fixture	Watts per fixture type
4 lamp T12	756	136W	102,816
3 lamp T12	32	102W	3,264
2 lamp T12	325	68W	22,100
1 lamp T12	19	34W	646
4 lamp T8	55	128W	7,040
3 lamp T8	18	96W	1,728
2 lamp T8	92	64W	5,888
60W incandescent or halogen	43	60W	2,580
75W incandescent or halogen	34	75W	2,550
100W incandescent or halogen	4	100W	400
150W Incandescent or halogen	6	150W	900
300W incandescent	1	300W	300
40W fluorescent U-tube	30	40W	1,200
13W compact fluorescent (CFL)	48	13W	624
23W CFL	10	23W	230
34W CFL	4	34W	136

Recommendations:

- **Replace all incandescent and halogen bulbs with compact fluorescent (CFL) bulbs.** 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.
- **Install motion-activated occupancy sensors in common areas such as restrooms, kitchen spaces and copy rooms.** 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.

- **Consider natural light sources when arranging furniture and work spaces.** Natural light is full-spectrum, aesthetically-pleasing and free. Even on overcast days, natural light can provide sufficient illumination for many tasks.

- **Delamp 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.

- **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 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 at 7-2969.

Computers and peripherals:

Observations:

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

Equipment	Quantity	Energy consumption on	Energy consumption standby/sleep	Energy consumption off
Computer	430	65W	2W	0W
Liquid crystal display (LCD) monitor	406	35W	2W	0W
Cathode-ray tube (CRT) monitor	56	65W	up to 45W	0W
Misc. printers/copiers/faxes	103	13-1665W	>5-300W	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 less). 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 workspace.
- **Turn off printers at night (especially laser printers)** that typically are on all day. 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 200W while in standby. The average standby power draw is 53W. If high volume printing is not necessary, recommend that staff use inkjet printers, which typically use considerably less energy (<5W) when in standby.
- **Network printers within workgroups** so that the total number of printers can be decreased. Using the high-capacity printers to their fullest capability will save energy as well as decrease the need for purchasing numerous different print cartridges. These larger printers are also more commonly capable of printing on two sides, decreasing the volume of paper purchased. The cost of a conduit to network a printer is around \$100. For more information, please contact sustainability@oregonstate.edu.
- **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:

- 19 small refrigerators and 8 regular size refrigerators were observed;
- 15 TVs, 22 microwaves, and numerous coffeepots, space heaters and fans 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.
- **Consolidate contents of small refrigerators into a larger, shared refrigerator.** 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.

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.**

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.

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 near printers small boxes containing this draft paper or leave a stack of this paper in printer bypass feeders.

Recommended and Potential Energy Conservation Measures		
Conservation Measure	Annual Savings (kWh)	Annual Savings (\$)
Replace all incandescent and halogen bulbs with compact fluorescents (CFLs)	12,465 kWh	\$536.00
Reduce total lamp hours (1 lamp on for 1 hour) of overhead lights by 1000 per day (ex. 100 bulbs off for 10 hours); accomplished through delamping, occupancy sensors, better task lighting etc.	12,410kWh	\$533.63
Turn off all computers at night that typically run 24/7; estimated impact is 100 computers	65,100 kWh	\$2,799.30
Turn off all printers (especially laser printers) at night that typically run 24/7; estimated impact is all laser printers	35,564 kWh	\$1,529.26
Unplug (or use surge protector switch-off) all small office equipment (cell phone chargers, coffeepots, TVs etc.) at night that are typically plugged in 24/7/365; estimated 1000W total	6,510 kWh	\$279.93
Total savings if above changes are implemented	132,049 kWh	\$5,678.12

By implementing the changes listed above 267,004 lbs of CO₂¹, 1,717 lbs of SO₂² and 89,793 lbs of NOx² 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. I can be reached at sustainability@oregonstate.edu or 7-3307. Other staff or departments interested in receiving a Sustainability Audit are also welcome to contact me at the email and phone number listed above. Thank you for your time and participation.

Greg Smith
Sustainability Office