

Sustainability Audit Report

Submitted: October 14, 2008

Audit performed by: Greg Smith and Kelsey Fisher

Space/Date Audited: LaSells Stewart Center/August 22, 2008

Building contact: Tina Green-Price

Lighting

Observations:

- Typical fixtures were single or double lamp T12 fluorescent and 40-60W halogen track lighting
- Lights were usually off in unoccupied rooms.

| Fixture Type | Quantity | Energy use per fixture | Watts per fixture type |
|-------------------------------|----------|------------------------|------------------------|
| 4 lamp T12 | 62 | 136W | 4760 |
| 2 lamp T12 | 222 | 68W | 15096 |
| 1 lamp T12 | 124 | 34W | 4216 |
| 2 lamp T8 | 13 | 64W | 832 |
| 38W incandescent or halogen | 153 | 40W | 6120 |
| 58W incandescent or halogen | 36 | 60W | 2160 |
| 100W incandescent or halogen | 1 | 100W | 100 |
| 1000W incandescent or halogen | 60 | 1000W | 60000 |
| 500W incandescent | 25 | 500W | 12500 |

Recommendations:

- **Consider replacing the halogen gallery bulbs with LEDs.** These lights require much less electricity; only three watts per bulb compared to 40 for the current lighting. They are also now available in the same color temperature as incandescent bulbs. With a lifespan of up to 100,000 hours, replacing the current bulbs with LEDs could have a payback period of approximately six years. If UL approval is necessary continue to watch for these bulbs as there are currently products with a pending approval. There is also a possibility of using compact fluorescent bulbs in this application. For more information on pursuing either option, please email sustainability@oregonstate.edu.
- **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.
- **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.
- **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 by email at FacilitiesCustomerServ@oregonstate.edu or by phone at 7-2969. Notes on specific areas with burnt-out bulbs are available upon request.
- **Consider continuing to replace all 1000W stage lighting with more efficient 500W models.** These newer theatrical lights use less energy and often still provide better quality lighting. However, due to the high cost of these new lights and a low number of hours used annually, there is an almost 30 year payback period.

Computers and peripherals

Observations:

- Some computers, monitors, and printers were on in unoccupied spaces.

| Equipment | Quantity | Energy consumption on | Energy consumption standby/sleep | Energy consumption off |
|--------------------------------------|----------|-----------------------|----------------------------------|------------------------|
| Computer | 15 | 65W | 2W | 0W |
| Liquid crystal display (LCD) monitor | 19 | 35W | 2W | 0W |
| Misc. printers/copiers/faxes | 4 | 140-1350W | 5-48W | 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.
- **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 80W while in standby. The average standby power draw is 37W. 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:

- 2 small and 1 industrial size refrigerators were observed.
- 1 microwave, 2 coffee pots and an ice machine 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. A surge protector would be especially helpful in the Agriculture rooms where the phantom loads of the projectors alone were 21 watts.
- **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. This would also help eliminate the need for staff to keep lunches in the industrial fridge.
- **Keep fridge at least one and a half inch 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.

- **Consider unplugging industrial appliances when not necessary for events including the refrigerator and coffeepot.** It appeared that there should be adequate space in the smaller refrigerators for staff lunches. As for the large coffeepot, it uses 45 watts even when the switch is “off”. Even the cost of purchasing a standard home kitchen coffeepot for the office would quickly be offset by the savings. By only powering these units for special events, over \$150 could be saved each year.

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.

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.

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:

- Only a scant amount of insulation was observed in the auditorium attic space.
- Several electric water heaters were noted throughout the facility.

Recommendations:

- **Consider installing additional insulation around Austin Auditorium.** Insulating Austin Auditorium would help decrease the large heating and cooling costs. For attic spaces, fiberglass batting is generally the easiest option, but blown in cellulose is another viable option. Even saving just five percent of yearly heating costs could create a payback period of only four years. For more information on insulation, please email sustainability@oregonstate.edu.
- **Consider installing a solar hot water system.** The Center's abundant roof space makes it a great choice for this type water heating. An evacuated tube system could have a payback period of less than 10 years. Energy Trust of Oregon incentives are available for solar hot water installations, with a potential of up to 35% of the project costs. For more information, visit their website <http://www.energytrust.org/RR/SWH/provide.html>. There is also potential for federal tax rebates. For any additional information concerning solar hot water or Energy Trust, please email sustainability@oregonstate.edu.

Recommendation Summary

all figures are estimates

| Recommended and Potential Energy Conservation Measures | | | | |
|---|-----------------------|-----------------------|-------------------------------------|-----------------------------|
| Conservation Measure | Annual Savings | Annual Savings | Implementation Cost | Return on Investment |
| Replace gallery halogen lighting with LEDs. Estimated 120 bulbs. | 18,296 kWh | \$915 | Estimated \$5,500 | 6.0 years |
| Turn off all computers at night that typically run 24/7; estimated impact is 15 computers. Enable Standby modes. | 8,640 kWh | \$432 | \$0 | Immediate |
| Turn off all printers at night typically run 24/7; estimated impact is 4 printers. Enable Standby modes. | 812 kWh | \$165 | \$0 | Immediate |
| Unplug (or use surge protector switch-off) all small office equipment (cell phone chargers, coffeepots, TVs etc.) at night; estimated 90W total | 788 kWh | \$40 | Avg. \$3/power strip; \$15 total | 2.6 years |
| Unplug industrial appliances when not in use. Estimated 400 W. | 3,302 kWh | \$165 | \$0 | Immediate |
| Improve building envelope by installing additional insulation, esp. above Austin Auditorium. | 34,500 kWh | \$1,725 | Estimated \$5000 | 2.9 years |
| Install a solar hot water system. | 30,000 kWh | \$1500 | Estimated \$6000 | 4.0 years |
| Replace old theatrical lighting with more efficient 500W fixtures. Estimated 60 fixtures. | 9,000 kWh | \$450 | Estimated \$12,000 | 27 years |
| Total savings if above changes are implemented | 139,847 kWh | \$6,992 | \$35,515 | 5.1 years |

By implementing the changes listed above approximately 279,694 lbs of CO₂¹, 350 lbs of SO₂² and 448 lbs of NO_x² 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 737-3307 or email us at sustainability@oregonstate.edu. 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

Kelsey Fisher
Sustainability Office