

Environmental Responsibility Assessment and Plan for Tulane's Department of Earth and Environmental Sciences

Introduction

The Department of Earth and Environmental Sciences (EES) is a leader for environmental education and research on Tulane University's Uptown Campus. EES also aspires to be a leader in environmentally responsible practices in its day-to-day operations. In Spring 2012, an assessment of EES environmental responsibility was undertaken to determine where it stands in meeting this goal and to determine how it can improve. The assessment included a survey of EES affiliates to assess thermal comfort, energy efficiency, recycling habits, commuting habits, and more. The results of the survey are presented first. The remainder of the document outlines a plan for sustainable operations, organized by the following topics: greenhouse gas emissions, waste reduction, purchasing, and water.

Survey Results

During the week of March 5-11, 2012, the faculty, staff, and graduate students in EES were asked to complete a survey to glean information about their current habits and their thermal comfort in EES facilities. Thirty individuals responded to the survey, of whom 13 were faculty, 5 were staff or postdoctoral fellows, and 12 were graduate students. The response rates were 87%, 71%, and 71%, respectively.

Thermal Comfort

Forty percent of respondents were either satisfied or had neutral feelings about the thermal comfort in their lab and office spaces. The remaining 60% were dissatisfied, but there was no consensus, indicating that spaces were over or under conditioned. Some respondents were too warm in their spaces during the summer months and too cool during winter months, others had the opposite problem – too cool in summer months and too warm in winter months. Still others experienced thermal discomfort that wasn't necessarily tied to weather conditions. Respondents were asked to share their office and lab locations. The responses from the thermal comfort section have been mapped to the buildings to determine whether there is any discernible pattern (see Appendix A). On the second floor of Blessey Hall, there is a discernible pattern – the south-oriented offices tend to be warmer in the summer and cooler in the winter, while the north-oriented offices tend to be cooler in the summer and warmer in the winter. Otherwise, there is no pattern to the discomfort felt and personal preferences are likely the driver of (dis)comfort. The results of the survey will be shared with Facilities Services so that they can attempt to improve occupant comfort.

The survey also asked respondents open-ended questions about their preferred A/C and heating temperature settings. On average, 71°F is the preferred heat setting and 74°F is the preferred A/C setting. Facilities Services will be consulted and, if possible, these will be the standard settings for EES controlled spaces. (Complications could include humidity control or space shared with other departments.)

Recycling and Waste

Survey respondents were asked about their recycling habits, and a majority (67%) recycles at least 75% of their paper waste on a weekly basis. A smaller majority (54%) recycles at least 75% of their #1 and #2 plastic, but only 44% of respondents recycle 75% or more of their aluminum cans. A lack of recycling bins is the most commonly cited reason that people do not recycle more, and some indicated that they aren't sure whether the custodian is actually recycling their paper, bottles, and cans. The survey asked which types of receptacles each person has in their individual office and lab spaces, and that information will be used to distribute recycling bins more widely. Finally, the survey asked whether EES affiliates typically bring a reusable cup to campus eateries; results showed that 70% of respondents bring a cup at least sometimes.

Energy Habits

This section of the survey asked about energy use and the things that people do to reduce their energy consumption in EES facilities. All respondents indicated that they turn off the lights when they leave their offices and labs at least 25% of the time, and 70% of respondents turn off the lights (or have a motion sensor that does it for them) at least 75% of the time when they leave for more than 10 minutes. A majority of respondents (77%) indicated that they use some type of power saving settings on their computers when they are not in use.

Miscellaneous

The questions in this category did not fit into the sections defined above. The survey asked whether there were any actions taken to reduce energy use by fume hoods in the labs. The 9 people who responded indicated that they were aware that closing the fume hood and turning off the light when not in use are the best ways to operate it efficiently. Regular inspections by OEHS also contribute to the proper functioning of the hoods in EES labs.

The last part of this section asked about commuting habits. A large number of EES affiliates use no-carbon transportation (walking and biking) and many use fuel efficient vehicles or participate in some type of rideshare or public transportation. Based on the responses, the estimated commuting carbon footprint for EES is 15.7 Metric Tons of Carbon Dioxide Equivalent (MTCDE) per year. (Note that per LEED¹ guidelines, anyone who didn't answer the survey is assumed to drive a typical vehicle alone.) For comparison, the 2010 commuting carbon footprint for the entire university was 10,609 MTCDE. If EES had the same commuting profile as the average university constituent, its portion of that 10,609 MTCDE

¹LEED stands for Leadership in Energy and Environmental Design. The LEED standards referenced here are from the LEED 2009 Green Building Operation and Maintenance Guide.

would be 34.1 MTCDE. Thus, EES's estimated footprint based on this survey (15.7 MTCDE) is 54% lower than expected.

Overall Impressions

Based on the responses of the 30 persons who took the survey, EES is well on its way to being environmentally responsible and a role model for other departments on Tulane's campus. The actions suggested in this report will make EES an even "greener" department. The survey could be repeated in approximately one year to measure whether the suggested actions have the impact that is expected.

Greenhouse gas emissions

Climate change is arguably the most important environmental issue of our time. EES can take the following steps to reduce its greenhouse gas emissions and lessen its impact on climate change.

Energy efficiency – Laboratories

Labs tend to be the most energy intensive facilities on a typical college campus. The U.S. Department of Energy and the Environmental Protection Agency have partnered to encourage energy efficiency in laboratories through their "labs for the 21st century" (Labs21) program. Labs21 offers advice and tools for designers and users of laboratory facilities. All EES faculty should familiarize themselves with the Labs21 website at www.labs21century.gov.

Most of the energy efficiency measures that can greatly improve the environmental performance of laboratories are related to design and construction of facilities, so EES should certainly prioritize energy efficiency when the opportunity to build or renovate facilities is available. However, the following advice is applicable in the meantime to reduce the energy used in existing facilities.

- ✓ Buy more energy efficient equipment, all other factors (e.g. performance) being equal. See http://labs21.lbl.gov/wiki/equipment/index.php/Energy_Efficient_Laboratory_Equipment_Wiki for guidance.
- ✓ Keep the sash lowered completely and turn off the lights when a fume hood is not in use.
- ✓ Unplug equipment that isn't being used regularly, especially anything that has lights or indicators that stay on when it is not in use.
- ✓ Whenever possible, turn off equipment or use a low power setting (e.g. sleep mode) overnight and when it is not actively being used.

Energy Efficiency – Offices

While not as energy intensive as laboratories, there are opportunities in offices to reduce energy use.

- ✓ Purchase Energy Star labeled electronics for use in offices. The Energy Star label indicates that a product is the most energy efficient model on the market. As overall energy efficiency of a particular type of product improves, Energy Star ratings are tightened so that only the top performers can earn the label.
- ✓ Share when feasible. Network capabilities allow for sharing of equipment like printers, scanners, fax machines, copiers, and multi-function devices. EES already has a networked multi-function device in

the main office, so everyone should be encouraged to use that instead of purchasing devices to go in their own offices. Adding color capability – through upgrade of the existing machine or through the addition of a smaller networked color printer on the second floor – may encourage more people to use this option.

- ✓ Use “smart” surge protectors. These technologies reduce the energy used by equipment on standby, which is often called “vampire electricity.” A “smart” surge protector will cut off electricity to all equipment when one main item of equipment is turned off. For example, a printer and speakers can be plugged into outlets that are dependent on a computer so that they only draw electricity when the computer is on and being used.
- ✓ Use power management software on all computers. The power management software automatically reduces the energy use of the computer when it is not in use. Settings are customizable so that you can tailor them to your needs and computer use habits. At a minimum, the monitor should be set to go off, but it is even better if the computer is set to enter standby (low power) or hibernate (no power) mode after 1 to 2 hours of inactivity. All power management settings are designed to resume the previously opened programs and files, unlike shutting down which closes all programs.

Energy Efficiency Habits

Energy efficient habits can be used in all campus facilities – offices, labs, classrooms and common areas. All EES affiliates should set an example by making the following habits a part of their daily routine.

- ✓ Turn off lights when you leave a room for more than a few minutes. The university has emergency lighting all over campus, so leaving lights on for safety reasons is not an issue. In short, wherever there are operable light switches, they should be used.
- ✓ When possible, use day-lighting and low wattage task lighting rather than full overhead lighting.

Transportation – Field Work

- ✓ Consolidate trips if possible. For example, if several errands need to be run to prepare for a field trip, plan ahead so all of them can be taken care of in one round trip rather than several trips to and from campus. Or, if several labs need to shop at Wal-Mart for supplies, go together.
- ✓ When large groups go into the field, take as few vehicles as possible. This could be encouraged by a policy of only reimbursing fuel and/or mileage for the least number of vehicles that could feasibly accommodate a trip.
- ✓ When replacing existing EES owned fleet vehicles, choose the most fuel efficient model available. The EPA’s fuelconomy.gov and the ACEEE’s greencars.org are great resources for comparing the environmental attributes of vehicles. EES should also consider alternative fuel vehicles as they become more widely available and less expensive.

Transportation – Professional Travel and Conferences

- ✓ Take a bus or train if possible. For closer destinations, driving a car is also environmentally preferable to flying. See [this](#) report by the Union of Concerned Scientists for the best travel option based on the distance to your destination.
- ✓ If 2 or more people are going to the same destination, carpool to reduce the carbon footprint of the trip.

- ✓ Consider purchasing carbon offsets from a reputable vendor to offset the emissions from your flights. Even better, try to offset the carbon emissions in your own day to day activities, on campus or off.
- ✓ When you do have to fly, plan ahead so that you do not have to rent a car at your destination. Research public transportation options, try to get a hotel room within walking distance of your conference or meeting, arrange to stay near a colleague so you can share a cab, etc.
- ✓ Consider meeting remotely. Tulane has a variety of teleconferencing facilities on campus; see http://tulane.edu/tsweb/GreenIT/videoconferencing_tools.cfm. If you need to meet with a colleague one-on-one or in a small group, a combination of teleconferencing and web applications may be almost as good as an in person meeting and will save travel time as well as greenhouse gas emissions.

Transportation – Personal Commute

Personal commuting of faculty, staff and students accounted for 6-7% of Tulane’s greenhouse gas emissions during 2006-2008. You can reduce your contribution to Tulane’s greenhouse gas emissions by choosing an alternative to driving alone in a typical vehicle or light truck (including SUVs and vans).

Waste Reduction and Recycling

Reducing landfilled waste helps to preserve habitats and prevents greenhouse gas emissions. Recycling reduces the amount of virgin materials used to make new products and can also reduce greenhouse gas emissions from the extraction of raw materials. EES can take the following steps to reduce its waste and increase its recycling rate.

REDUCE

- ✓ Reduce packaging waste by ordering in bulk and asking vendors to ship orders in as few boxes as possible. When ordering online, there may be a choice between “ship as my items become available” or “ship all at once.” Unless the order is urgent, choose to wait and have everything shipped at once.
- ✓ Share supplies that can be ordered in bulk with other labs and offices. There may be significant cost savings as well.
- ✓ Print double-sided whenever possible.
- ✓ Use the reverse sides of used paper to print drafts and take notes.
- ✓ Use font and margin settings that reduce the number of pages necessary to print a document.
- ✓ Consider composting food scraps and other organic waste. A waste audit was not done as part of this assessment, but would be useful for determining the impact that EES could have by composting its organic waste. If only a small portion of waste is organic, the cost of composting may not be justified. However, if cost effective, composting has the twin benefits of reducing the amount of material that goes to landfill and reducing greenhouse gas emissions. Composting is an aerobic process, meaning that much less methane is generated by organic waste when composted instead of landfilled. (Methane is 25 times more effective at trapping heat than carbon dioxide.)

REUSE

- ✓ Reuse as much as possible. Set up an area in the main office for the exchange of unwanted used items like file folders, plastic sheet protectors, binders, etc.
- ✓ Buy or collect reusable cups for the kitchen; use them for seminars and other department sponsored events. There should be a system for ensuring they are cleaned. Alternately, ask everyone to bring their own cup to seminars and events and only provide a limited number of disposable cups.
- ✓ Contact Movable Property Management at 865-5219 when you need furniture and equipment. They have a variety of used furniture and it is all free.

RECYCLE

- ✓ Make sure that every office has a paper recycling bin and that there are plastic/can recycling bins in the hallways and common areas that are easily accessible for everyone.
- ✓ Work with facilities to ensure that the custodian is trained to properly empty the recycling bins.² Designate someone as a point person to interact with any new custodial staff to ensure consistency.
- ✓ Ensure that empty toner cartridges are sent back to the manufacturer – most vendors offer a take-back service with free shipping. If that is not possible, take empty toner cartridges to 107 Richardson Building for recycling by the Office of Environmental Affairs.
- ✓ Recycle old electronics. Tulane offers free recycling for all electronics. Designate a space in the EES buildings for electronics drop off and designate one person to put in the requests for pick up through Service Wave.
- ✓ Ensure that soda and water bottles are recycled after the EES seminars, as well as tops of pizza boxes (the bottoms are too greasy for recycling). A bottle and can recycling bin should be put in or near the room(s) most typically used for seminars.

Purchasing

EES can make its purchasing more sustainable by supporting the local economy, choosing products that have high recycled or rapidly renewable content, and choosing used items whenever possible.

Food

- ✓ EES orders a large number of pizzas for its weekly seminars. Consider changing pizza vendor to support local businesses. Naked Pizza, Pizzicare, and Midway Pizza are possible options, and a comparison of costs indicates that EES could order from them at little to no extra cost. Another option would be to use a caterer who offers local and organic fare. In general, catering will be more expensive than ordering pizza, however.
- ✓ Ask caterers for more formal events to make meals with as many local and organic ingredients as possible.

² Note that the custodians will be trained by the Tulane Recycling Coordinator to empty the new recycling stations that were installed at the end of April 2012.

- ✓ Purchase food labeled as USDA certified organic, Food Alliance Certified, Rainforest Alliance Certified, Protected Harvest Certified, Fair Trade, or Marine Stewardship Council's Blue Eco-Label. All these labels have been verified, and meet LEED Guidelines for sustainable purchasing. Beware of claims such as "natural" which may sound eco-friendly but don't have any evidence to back them up. If you see a label other than those mentioned, research it and its claims before assuming it has any real meaning.
- ✓ Consider serving vegetarian meals for department sponsored events. If meat must be served, choose options with the lowest carbon footprint. See <http://www.ewg.org/meateatersguide/at-a-glance-brochure/> for guidance.

Durable Goods and Ongoing Consumables

- ✓ Purchase Items that meet LEED guidelines for sustainability as much as possible. The list below is combined from the LEED purchasing guidelines for durable goods with a lifetime of 2+ years (e.g., furniture, office equipment) and ongoing consumables that are replaced regularly in the course of business (e.g. paper, batteries, toner):
 - Purchases contain at least 10% post-consumer and/or 20% pre-consumer recycled content
 - Purchases contain at least 50% rapidly renewable materials
 - Purchases contain at least 50% materials harvested and processed or extracted and processed within 500 miles
 - Purchases consist of at least 50% Forest Stewardship Council (FSC) certified paper or wood products
 - Batteries are rechargeable
 - Purchases are Energy Star qualified
 - Purchases of durable goods (especially furniture) contain at least 70% salvaged material
 - Used durable goods are purchased or chosen for free from Movable Property Management
- ✓ Banish all incandescent light bulbs from desk lamps immediately. Replacement bulbs should be Energy Star Labeled. (ES labeled bulbs meet strict quality control specifications and contain less mercury.)
- ✓ Source a more sustainable paper plate option for seminars and events. There are companies that make plates from recycled materials and from rapidly renewable materials, like bamboo.

Water

The treatment and discharge of potable water has many environmental impacts. In New Orleans, the energy used for water treatment and pumping is one of the largest local sources of greenhouse gas emissions, so reducing water use is also a means to reduce the department's indirect climate footprint. EES can take the following steps to reduce its water use.

- ✓ Ask Facilities Services to fix leaks promptly. Leaks are considered an urgent service request, so call them at 865-5445 whenever you notice a leak.
- ✓ Don't let water run while washing dishes and lab ware. For just a few items, wet a sponge, turn off the water while you wash them, and then give them a quick rinse. For bigger loads, fill the sink with

water and soap then rinse quickly. Dishwashers are generally more water efficient than people; if enough items are washed on a daily basis, consider installing a dishwasher.

Drinking Water

A recent life-cycle assessment³ of bottled, tap, and home/office delivery water concluded that bottled water has the largest environmental impact of all systems studied. Tap water has the smallest environmental impact, which is driven mostly by the energy used to wash reusable containers it is drunk from. Home/office delivery (HOD) water (which is EES' current system) had an impact greater than tap water but less than individual bottles of water. Most of the impact was driven by the washing of reusable containers and the transport of the water. Based on the LCA report, tap water would be the best option for drinking water for EES.

However, the taste of New Orleans tap water is not excellent, and removing the existing HOD system *may* cause people to purchase bottled water for themselves. Based on that assumption, EES has three options for drinking water. None will have the small environmental impact of tap water, but each would deliver water with a decent enough flavor that people wouldn't feel the need to buy bottled water for themselves.

- ✓ Switch to a water filtration system with a chiller unit. Kentwood installs and services "MyUtapia" water filtration systems. The system can be installed at a sink as an extra tap that dispenses room temperature filtered water or it can be installed with a chiller/heater unit that dispenses hot, cold and room temperature filtered water. The system can be installed within 20 feet of any water source, with or without a drain (depending on the filtration system), so it would be feasible to install in the EES kitchen.
- ✓ Purchase an Energy Star labeled refrigerator with a water filter and ice maker that dispenses water through the door. (For hot water, a relatively cheap and environmentally friendly option would be to keep an electric kettle in the kitchen.) This option would require that someone on the EES staff maintain the filter or that EES pay Facilities Services to maintain the filter. Facilities Services would likely need to install a water line for the refrigerator as well.
- ✓ Keep Kentwood delivery service of 5-gallon bottles.

Campus Resources

Tulane's primary resource for improving campus environmental performance is the Office of Environmental Affairs. Their website – green.tulane.edu – contains information on all campus-wide initiatives such as the recycling program, the president's climate commitment, and green purchasing. OEA is aware of this plan and the desire of EES to be an environmentally responsible department. In the future, they may contact EES about serving as a test department for new initiatives.

³ Franklin Associates. 2009. Life Cycle Assessment of Drinking Water Systems: Bottle Water, Tap Water, and Home/Office Delivery Water. Revised Final Peer Reviewed LCA Report. State of Oregon Department of Environmental quality. <http://www.deq.state.or.us/lq/sw/wasteprevention/drinkingwater.htm> (accessed 2/3/2012)

EES faculty, staff, and graduate students should also be aware of Facilities Services' system for handling routine maintenance – ServiceWave. Whenever there is an issue with the building, especially one that could impede its environmental performance, a Service Wave request should be submitted. The system allows for tracking of each request and escalation of requests that are not dealt with in a timely fashion. Service Wave can be accessed at <http://servicewave.tulane.edu/home.html>, and more urgent requests (such as leaks or temperature discomfort) can be called in to the emergency customer service line at 865-5445.

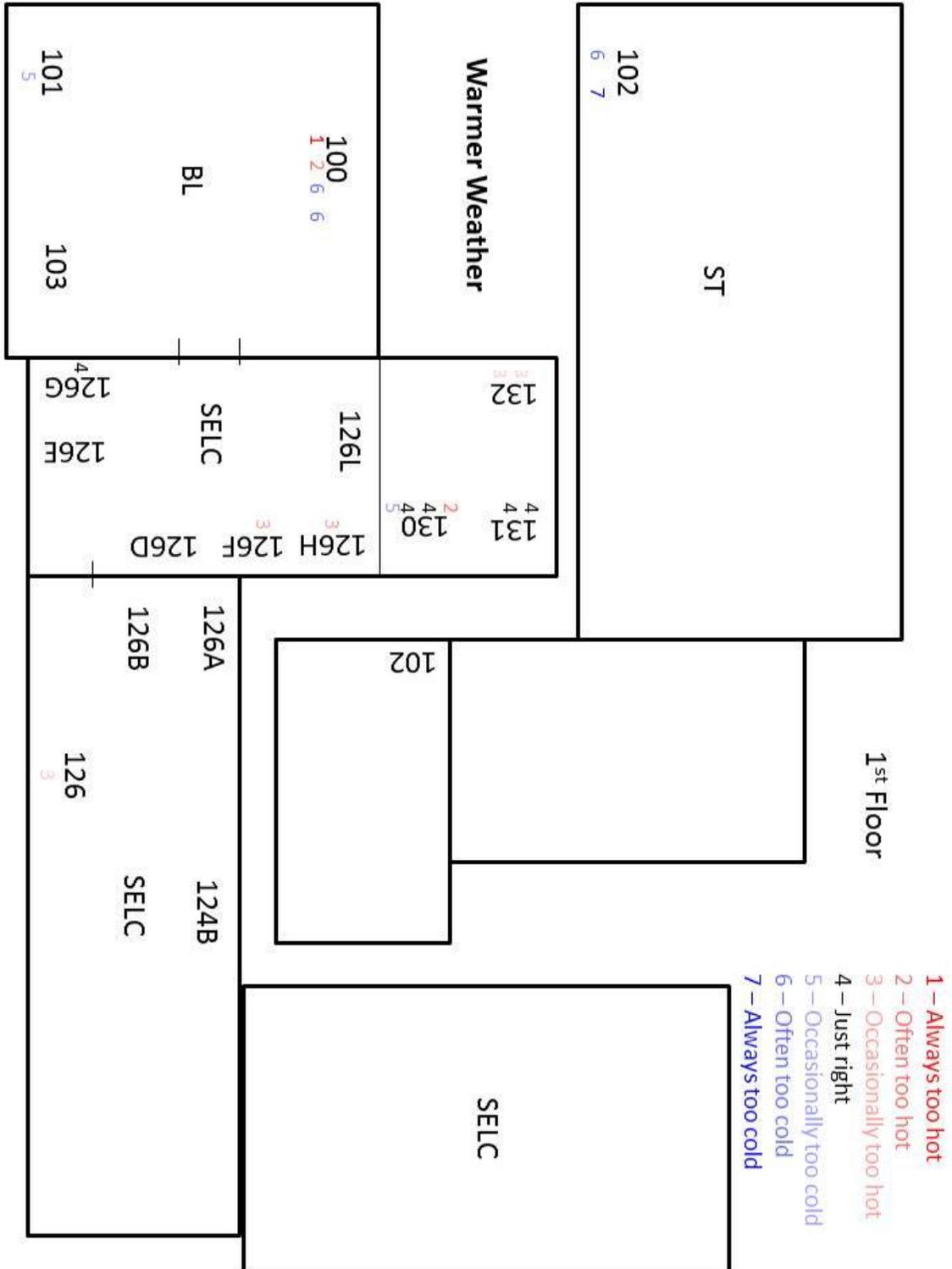
Conclusion

The Department of Earth and Environmental Sciences is already well on its way to being environmentally responsible and can take some relatively easy steps to become even more so. Some, like adding more recycling bins, will require departmental resources, but many are habits and activities that just need to be remembered to implement.

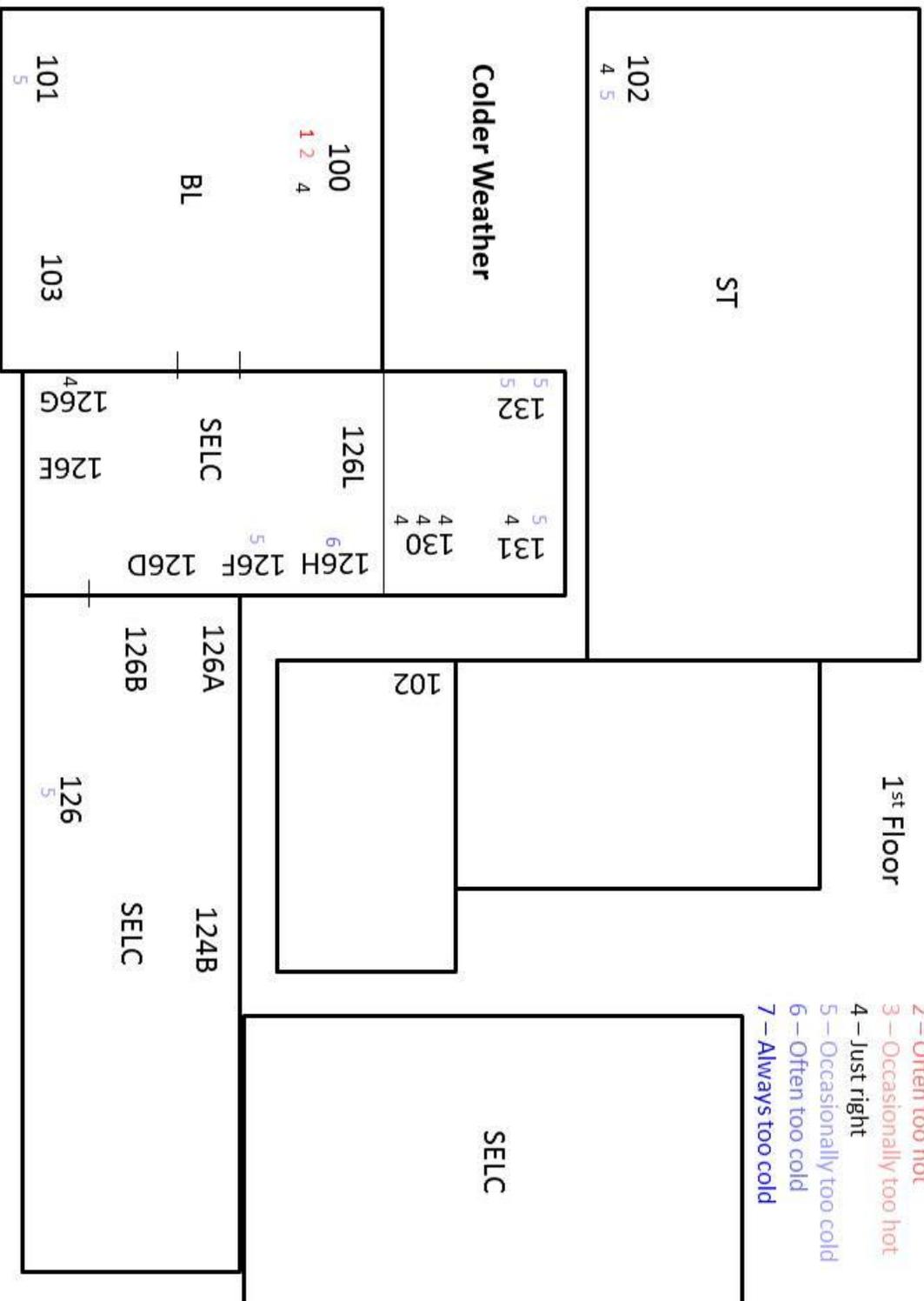
Individuals should take steps to reduce their carbon emissions, especially from travel and commuting. The department should use its purchasing power to make more sustainable choices, especially with bigger items, electronics, and bulk purchases. In the future, EES may also have opportunities to make larger changes, such as the renovation or construction of its facilities. When those opportunities arise, EES should make every effort to include environmental concerns in the decision making process.

Appendix A: Building Occupant Comfort Maps

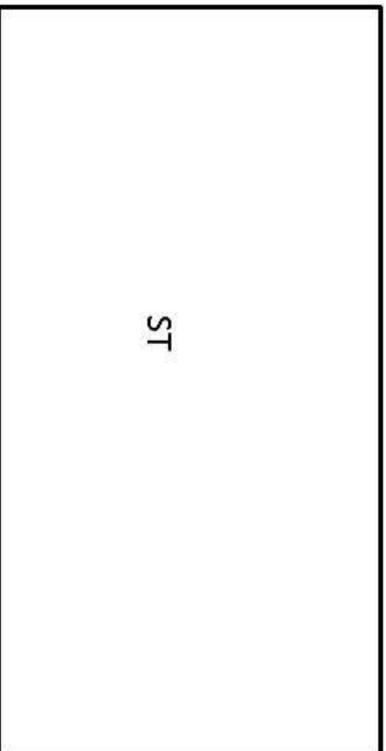
Below are the results of the occupant comfort survey mapped to the buildings* occupied by EES.



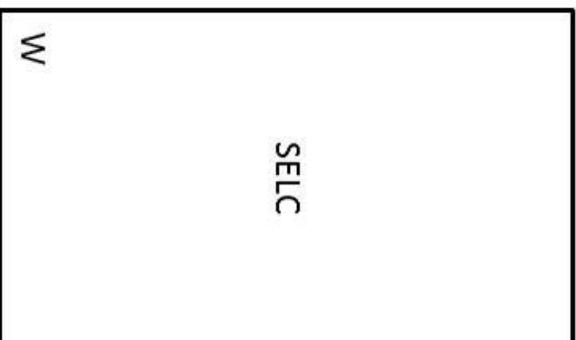
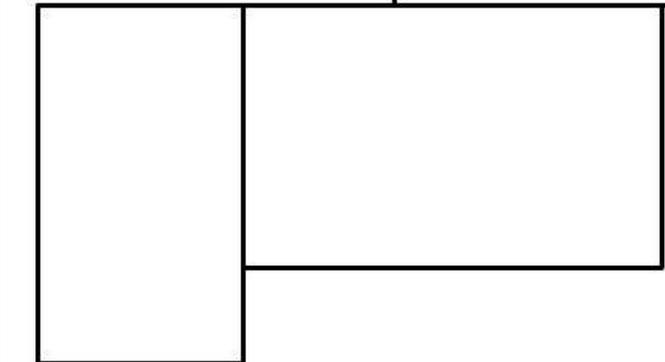
- 1 – Always too hot
- 2 – Often too hot
- 3 – Occasionally too hot
- 4 – Just right
- 5 – Occasionally too cold
- 6 – Often too cold
- 7 – Always too cold



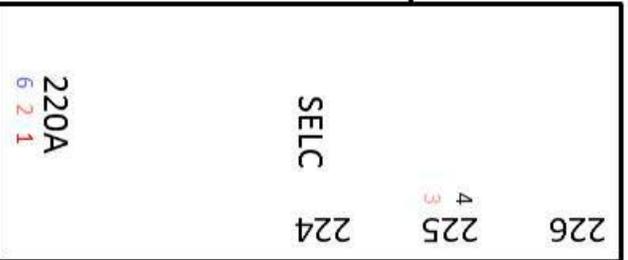
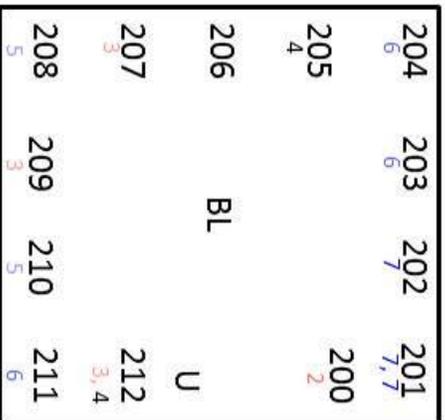
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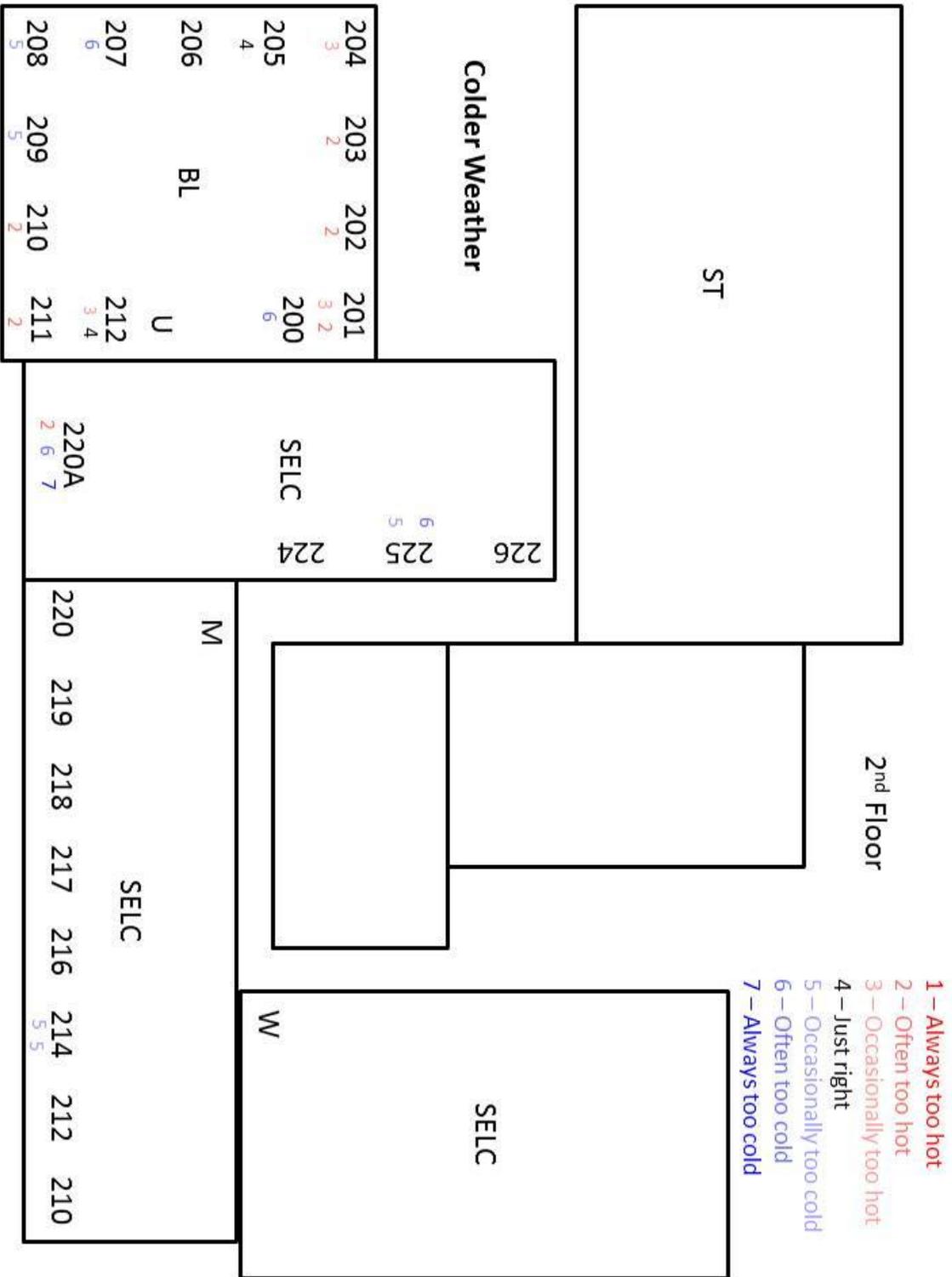


2nd Floor



Warmer Weather





*BL=Blessey Hall
 ST=Stanley Thomas Hall
 SELC=Science and Engineering Lab Complex

Appendix B: Useful Websites/Resources

Laboratories:

Labs for the 21st Century – <http://www.labs21century.gov/>
Information and resources related to operating laboratories efficiently

Vehicles:

www.fueleconomy.gov – EPA and DOE site that lists the average fuel economy of new and used vehicles

www.greencars.org – Site of the American Council for an Energy Efficient Economy's (ACEEE) Green Book program. They rank all current model year vehicles in terms of environmental impact. You can always see the current year's "greenest" and "meanest" vehicles, but you need a subscription to view the ratings for all other vehicles or previous years' vehicles.

On Campus:

Office of Environmental Affairs – <http://green.tulane.edu>

Facilities Services – servicewave.tulane.edu

Place non-emergency service requests and check the status of existing requests.

Green IT – <http://tulane.edu/tsweb/GreenIT/index.cfm>

Resources related to greening efforts in the technology services departments, includes a list of on-campus teleconferencing facilities.

Recycling – <http://recycle.tulane.edu>

Information about Tulane's recycling program and links to city recycling information for personal use.

Others:

Union of Concerned Scientists – www.ucsusa.org

UCS issues useful science-based reports on environmental issues and they often provide guidance on the most effective environmental choices.

Grist – www.grist.org

Grist is a daily environmental news website, and their "Ask Umbra" column is a great resource for advice on environmentally responsible choices. Grist also keeps tabs on the latest studies and information related to living sustainably.

Meat Eaters Guide – <http://www.ewg.org/meateatersguide/>

Information about the environmental impacts of various meat and dairy foods, as well as some of their veggie alternatives.

Travel – http://www.ucsusa.org/assets/documents/clean_vehicles/greentravel_slick_opt_web.pdf

The "Getting there Greener" guide to the best transportation options based on distance travelled.