

# Denison University – Energy & Occupant Use Standards

*Established 9/23/13*

Energy and occupant use standards are a part of Denison's overall energy policy to insure that excellent conditions exist in our academic, residential, and administrative buildings that will enhance the living and learning environment while minimizing energy use. These standards outline responsibilities of all building users to be an integral part of minimizing energy consumption and insure compliance with appropriate state and federal requirements on indoor air quality.

This campus energy policy reflects the collaborative work of Facilities Services and the Campus Sustainability Committee. In all cases, when technology is being deployed to reduce energy and water use on campus, preference will be given to utilize products made in the USA.

## **Goals for Denison's Energy Policy**

- 1) To provide a healthy and comfortable environment.
- 2) To be energy and resource efficient.
- 3) To reduce the campus carbon footprint
- 4) To educate students, faculty and staff about energy and water conservation.

## **Lighting**

Denison spends nearly \$2 million/year on its electricity. A large portion of the energy used goes towards lighting. In a typical classroom, every hour that the lights are left on equates to nearly \$0.10 of energy usage. In general, lighting shall be maintained in occupied areas at an appropriate level to maintain a safe and productive working and learning environments. In areas where natural lighting is available, electric lighting should be conserved to reduce energy costs. All occupants are expected to control the use of lights as required in the guidelines provided in this policy to insure lighting quality and balance energy use.

### *Guidelines*

1. If you don't need it – turn it off
2. Eliminate incandescent lamps in all buildings
  - a. Replace with LED or CFL lamps
3. Eliminate T-12 fluorescent lamps in all buildings
  - a. Replace with T-8 fixtures utilizing only 28 watt high efficiency lamps

4. Standard light color to be 3500k on all lamps
5. Utilize LED lights in areas where lights are on for more than 12 hours/day
  - a. All exit lights to be LED
6. Exterior:
  - a. Utilize LED/Induction for most exterior applications
7. Utilize occupancy sensors to control lights
  - a. Ceiling mounted 'intelligent', infrared & ultrasonic dual technology is preferred - occupant must be able to turn lights off - even when occupied
  - b. provide additional contacts for HVAC interface where applicable
  - c. provide adequate coverage of sensors when partition or other obstructions are in place
8. Utilize day-light harvesting techniques where applicable, especially in well-lit hallways and atriums
9. Programmable lighting controllers are not desired
10. Lighting designed to minimum IEEE recommended lighting levels

### **Heating, Ventilation, & Air Conditioning (HVAC)**

Heating and cooling consumes the majority of energy used by Denison and they are the biggest contributors to our campus carbon footprint. Appropriate control of heating and cooling is one of the greatest opportunities for energy savings and a significant factor in occupant comfort that contributes to educational quality and worker productivity. HVAC Systems are also required to provide clean healthy air to buildings and to insure that indoor air quality standards are maintained.

For a number of years Denison has implemented temperature setbacks for buildings to conserve energy and increase efficiency. This program has been largely effective but due to the differences in installed systems, not all buildings are currently capable of automatically setting back space temperatures. All new construction will follow the guidelines as will any renovated or upgraded system. A list of buildings currently using the setback routine is provided as an appendix to this policy.

#### *Guidelines*

1. Outside Design Conditions
  - a. Heating -10°F (99% ASHRAE design conditions)
  - b. Cooling 92°F DB, 73°F WB
2. Space Temperature: **Normal Mode**<sup>\*1</sup> Standby Energy-Efficient
  - a. Heating **68-72°F**<sup>\*3</sup> 64° 60°F

- b. Cooling<sup>\*2</sup>                      **74-78°F**<sup>\*3</sup>                      80°                      85°F

Note<sup>\*1</sup>: Unoccupied spaces may take up to 30 minutes to recover to desired temperature settings if they have been in Energy-Efficient mode.

Note<sup>\*2</sup>: Not all spaces on campus are air conditioned

Note<sup>\*3</sup>: Given the relative age and type of certain systems, some buildings and spaces may not be able to be maintained within the above temperature settings

- c. Data closets max. 76°F
- d. Limited temperature control for enclosed stairwells – maintain min. of 55°F in heating season - no heating for vestibules and entries
- e. General ventilation temperature control provided for mechanical, electrical, gyms, and other non-occupied spaces
3. Schedule for thermostat settings during the school year.

Building thermostats will be set to Normal mode (utilizing Standby and Energy-Efficient modes where the systems allow for it) during the hours listed below. After normal occupied hours, the building will revert to the Energy-Efficient mode: note - due to the inertia in the building mass, it will typically take several hours before temperatures reach the Energy-Efficient set points (if ever).

- a. Academic Buildings:
- i. 8:00am-9:00pm Su-Th 10am-7:00pm weekends
- b. Library:
- i. To follow posted schedule
- c. Administration and other misc. buildings:
- i. 8:00am-8:00pm M-F
- d. Residence Halls:
- i. 24/7 operation: setback when unoccupied is encouraged
- e. Sensitive areas: instrument storage, archives, special collections, animal holding, chemical storage,
- i. These areas will be maintained at a constant temperature
- f. Space temperatures and schedules will not be adjusted outside of these settings unless requested in writing
- g. Schedules will be adjusted during academic breaks to reflect actual building usage. This means certain buildings that do not have faculty and staff required to be on campus, will be set and maintained at the *Energy Efficient* temperature settings until the end of the specified break period. A list of affected buildings and spaces will be made public prior to each break.
4. Thermostats: Programmable thermostats with adjustment limits are

recommended on all stand-alone systems

5. Humidity: Generally not controlled
  - a. Spaces requiring tighter control of environmental conditions (i.e. musical instrument storage, archives, special collections, laboratories/spaces with chemicals, animal holding) Humidifiers may be used to control humidity within a specified range and with primary control to prevent rapid changes in conditions
  - b. Ground floor areas will be provided with dehumidifiers as necessary
6. Ventilation rates per applicable Ohio code at minimum levels
  - a. CO<sup>2</sup> control of demand ventilation is encouraged for future projects
7. Filters to be Minimum Efficiency Reporting Value (MERV) – 13 high efficiency
8. Variable water and air flow systems are encouraged – use Yaskawa VFDs
9. Heating water reset from OA temperature is required
  - a. Zone reset encouraged / Reset from room max encouraged
10. Supply Air reset from OA temperature is required / Reset from min/max. room loads encouraged
11. Loop chilled water temperature reset from OA temperature is encouraged - when humidity will permit
12. Equipment replacements should be evaluated based on cost/energy consumption - high efficiency equipment should be utilized when feasible

### **Computers & Technology Equipment**

Computers and technology equipment are integral to the education and work environment at Denison. All computer equipment purchased by the college is EPEAT certified which means it is energy efficient and in general made of components that can be recycled.

- 1) All computer monitors should be manually powered off whenever they are not actively being used even for a short period of time.
- 2) Computer CPUs and laptops should be powered down as soon as practical at the end of day or whenever a user is finished using them and they do not expect to be used again soon (generally within a couple of hours)
- 3) IT Staff will set default computer settings to ensure optimal energy conservation by placing computers into a low power sleep mode after a minimal time of inactivity and using system controls to insure systems are shut down as soon as practical when not needed.
- 4) Inkjet printers will no longer be supported by the college as they are the most inefficient means for printing\*<sup>1</sup>. Individuals should utilize printer/copiers that are connected to the campus server in office/department spaces.

Note\*1: Students may continue to utilize personal printers in their residence hall rooms

### **Miscellaneous Electrical Equipment**

Personal electrical appliances are a hidden energy cost for the college. All building users need to find ways to reduce energy use by eliminating personal appliances and by the consolidation of appliances to common areas.

- 1) Refrigerators are strongly discouraged in individual office spaces unless needed for academic or health purposes. More efficient refrigerators (Energy Star Compliant) should be placed in common areas where more people can utilize them. All refrigerators should be unplugged any time when not in use for more than 2 days.
- 2) Personal space heaters are a safety hazard and a significant energy use and should not be used on campus. In cases where temperatures are insufficient using the building heating systems, building users should contact Facilities Services to implement corrective measures.
- 3) Coffee pots and water heaters can be used, but every effort should be made to use brewers that can be emptied into a thermos or carafe. All heaters, warming plates, coffee pots must be equipped with an automatic timer shutoff for safety and energy conservation.
- 4) All electronic devices such as microwave ovens should be completely unplugged when not in use to save energy.

### **Water**

Denison spent over \$350,000 on water last year and uses over 35 million gallons annually. Conserving water, not only saves on the cost of clean water supplied to the college, but also reduces energy use associated with heating and pumping water around campus.

#### *Guidelines*

1. Utilize One Pint per flush urinals / Waterless urinals are not desired
2. Manual dual flush 'water saver' toilets are recommended on all projects
3. Low flow (1.75 GPM) shower heads to be used in all applications
4. Low flow aerators (.5 GPM) on all sink faucets – manual operation
5. Drinking fountains to be non-refrigerated and include bottle fillers if feasible
6. Irrigation permitted with written approval only and must utilize sources other than potable water supplied by the Village of Granville
7. Once through condenser cooling is prohibited on all future projects

8. System leaks to be identified and corrected promptly

### **Energy Policy Communication and Education**

Denison is committed to energy conservation as a long-term part of our sustainability plan and our commitment to be carbon neutral by 2030. Energy savings initiatives need continuous support and visibility to insure they return their full savings potential. Education and outreach are critical to achieving lasting conservation.

#### *Guidelines*

1. Facilities Services and the Office of Sustainability will make utility data available to the campus community via myDenison and through periodic progress reports
2. The Office of Sustainability will continue to implement the Green Office Certification Program and the Denison Sustainability Fellows will implement a comparable Green Dorm program
3. When appropriate the college's energy use will be incorporated into the curriculum and used for both faculty and student research
4. The Green Hill Sustainable Community Grant program will serve as a tool to engage more of the campus community in energy efficient projects
5. The college will look for ways to incentivize energy conservation to encourage participation in conservation best practices and the guidelines set forth in this document

### **Reporting and Auditing**

Facilities Services will monitor all buildings on an ongoing basis to ensure that occupancy and energy standards are being met in accordance with this document. All members of the campus community are encourage to report issues and concerns via the MyDenison service portal.

#### *Guidelines*

1. Facilities Services will notify building occupants if indoor air quality varies from these standards because of a malfunction or operational decision. In all cases, the safety of building occupants will come first.
2. Facilities Services will conduct random checks of the system to ensure that actual conditions in buildings reflect what the online monitoring system is recording.
3. Results of any MyDenison service submissions or queries will be made available upon request.

