

The graphic features three blue circles of varying sizes, each composed of concentric circles in different shades of blue. Two thin blue lines intersect at the top left and extend diagonally across the page, framing the circles.

# **Lincoln University Energy Conservation Program**

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# Lincoln University Energy Conservation Program

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## **Purpose:**

The Office of Administration recognizes that the operation of university buildings is a significant factor in the energy consumption of Lincoln University buildings. This program directs us to manage operational costs and sustain resources for future generations through efficiency and the use of clean, domestic energy resources. Increased efficiency of energy use in university buildings will result in cost savings and the preservation of valuable natural resources for the continued economic and environmental progress Lincoln University.

The goals of this energy program are to save on energy and its related costs and to protect our environment for future generations. Our goal is to partner with all state agencies and employees to accomplish these objectives.

This program will be a collaborative effort including the Department of Buildings and Grounds, Design and Construction, Office of Administration, and other departments. In addition, we will work closely with building occupants because energy conservation can only be successful when the building occupants understand and recognize the importance of the program's objectives. We recognize that conservation starts with ideas big and small, the implementation of which can produce large savings. We will also seek public and private input, and use existing and new technologies for energy savings.

## **Scope:**

### **A. Summary of Implementation Plan Initiatives**

This program requires the development of policies that “will result in reductions of energy consumption by 2% per year for each of the next ten years.” The Office of Administration will be the lead.

#### **The implementation plan shall consist of the following:**

1. Develop “Lincoln University Energy Conservation Program” for mandatory use in all university buildings, whether owned or leased.
2. Baseline information will be acquired from previous usage information provided by utility companies.

3. Continue to review building systems and operational procedures campus wide for efficiencies.
4. Identify energy-inefficient facilities through benchmarks and take necessary steps through operational enhancements or other methods to improve efficiency or reduce utility consumption.
5. Issue energy-efficient Design Standard imperatives for new construction and new leased facilities, and make those design standards available for adoption by other state agencies whose building management does not fall under the direction of the Office of Administration.
6. Aggressively confirm the measurement and verification of benchmarks and cost savings from existing energy savings contracts to ensure compliance, and build on the experiences gained through those contracts to deliver improved results.
7. Coordinate existing university energy potential with opportunities in renewable resources, and develop public-private partnerships, where available, with energy producers to produce operational savings.
8. Obtain the necessary funding resources to aggressively pursue the President's goals by completing energy audits and projects, using in-house resources where possible.
9. Identify and pursue opportunities to acquire funding through grants, incentives or other sources for reduction of utility impacts on budgets.
10. Maximize the role that university employees and others will play in the implementation of this plan by:
  - (a) Developing and initiating a high-visibility and consistent program to engage university employees in helping to save energy.
  - (b) Appointing an energy coordinator in each building to coordinate and promote various strategies to encourage employee commitment and cooperation.
  - (c) Using communications and public information to achieve energy- efficiency improvements.
11. Coordinate the planning and implementation with all university departments:
  - (a) To ensure departmental buy-in and benefit from agency expertise and experience;
  - (b) Coordinate training as necessary;

(c) Develop strategy to ensure that adequate resources, both human and financial, are committed to the project.

12. Communicate with Higher Education institutions and other public and private agencies to share information, transfer technology ideas, and identify possible shared funding sources.

## **B. Five Key Elements**

1. Faculty, Staff and Student Awareness Action Plan
2. Employee Participation Action Plan
3. Energy Conservation Action Plan
4. Energy Usage Tracking Action Plan
5. Building Equipment Retrofits and New Construction Action Plan

### **1. Faculty, Staff and Student Awareness Action Plan**

Communication is the key to developing a successful energy saving program. The following steps will achieve energy efficiency improvements through shared information and strategies across all Departments and with public entities.

1. Initiate a high-visibility program to engage participants to help save energy. This initiative could include the appointment of an energy coordinator in each building who will keep the subject of energy efficiency in front of employees.
2. Communicate with Higher Education institutions and other public and private agencies to share information, transfer technology ideas, and identify possible shared funding sources.
3. Communicate through the public information office to show we are leading by example. Show how this initiative is working through the media and web presence.

### **2. Employee Energy Participation Action Plan**

The Employee Action Plan consists of seventeen (17) ways each university employee can help to reduce energy in your work area.

1. When available, use revolving doors when entering and exiting buildings. Heat loss or gain through building openings can account for up to 18% of all building heating and cooling losses. Using revolving doors significantly

reduces infiltration of air that enters or escapes from buildings.

2. **Refrain from using electronic doors, which should be used only for handicap access.**
3. When possible, use the stairs instead of elevators. This reduces energy consumption as elevators can use up to 15% of a building's electrical consumption.
4. Open the blinds on sunny days in cooler months to increase warmth using solar energy, and close blinds to reduce the heat from the sun in warm months, reducing the building cooling needs.
5. Space heaters are prohibited in all university buildings because of safety concerns and electrical costs. These types of appliances consume significant amounts of electricity and are potential fire and safety hazards. Dressing in layers allows you to adjust to the temperature in the building.

(a) Space Heaters

- i. Buildings and Grounds continues to allow space heaters as ADA Accommodations.
- ii. Department is to purchase the type space heater recommended by B & G, current model is oil filled flat panel electric conduction heater, 400 watts, 1386 BTU, equipped with a tip-over safety switch, auto over heat protection, and is UL approved.
- iii. The department will maintain and provide to B & G a simple up-to-date list of the names of staff with space heaters approved for accommodations and which office they are located in to provide B & G staff a quick and easy method to verify whether or not a space heater in an office has been approved.
- iv. Departments will strictly enforce the no space heater rule in offices except for those approved as ADA Accommodations.
- v. Departments will closely examine accommodation requests to make sure they meet the requirements of the ADA before a request to approve a space heater is submitted to B & G.
- vi. Department staff that receive a space heater as an ADA Accommodation agree to unplug the space heater when it is not in use as part of the accommodation.

(b) Desktop Fans

- i. Departments are to purchase desktop fans up to 6" and monitor the use of fans to conserve energy.
6. Learn how to use the power management features on your computer. The typical computer and monitor can consume up to 60% of a computer's power requirement. Because of their numbers in a typical office, computers are generally the largest energy consumer followed by photocopiers, fax

machines and other office equipment. Most computers and monitors now come with power management features to power down your computer and monitor. Talk to your system administrator about how to enable the power management feature for the computer and monitor. Equipment not furnished with a power management system should be manually shut off at the end of each day.

7. Eliminate hot plates, coffeepots, refrigerators, microwaves and other small appliances in all work areas. Most office areas provide a kitchen or break area and are pre-wired for these applications. Use of these types of appliances outside of these designated areas can overload circuits and could be a fire and safety hazard.
8. When washing dishes in office kitchens, try to wash all of your dishes at once instead of one at a time. Water conservation saves money and preserves our natural resources for future generations.
9. Turn off lights in office areas during evenings and weekends. Turn off lights in unused common areas such as copy rooms, break rooms, conference rooms and rest rooms. Turn off task lights at night and whenever you are away from your desk for an extended period of time. Exterior lighting should be shut off automatically by photo cell or timer during the daylight hours or scheduled off as soon as possible after normal working hours. Parking lot lights should be on a photo cell timer to cycle off during day light hours.
10. When replacing lights or light fixtures, B & G will replace with energy efficient bulbs/fixtures.
11. Do not use lights for plants.
12. Turn off all lights, except security lights, if you are the last person leaving a room.
13. Unplug infrequently used equipment, such as televisions, DVD players, VCRs, etc. because they consume power even when turned off.
14. Make sure that plants, books or furnishings do not block air vent grills. If you are hot or cold, please contact B & G to have temperature regulated according to building standards. Blocking air vents can reduce fresh air and increase health problems.
15. Schedule meetings, testing and events during normal working hours as large lighting,

heating, and air conditioning (HVAC) systems are very costly to operate.

16. The temperatures in all buildings should be held between 74° F to 78° F in the summer and 68° F to 71° F in the winter. Specific facilities may require variation in temperature due to building operation and special needs.
17. Do not open windows or prop doors as this will introduce humidity, mold and extreme temperatures into buildings. This will increase the heating or cooling load and may overload the HVAC system increasing energy costs.

### **3. Energy Conservation Action Plan**

This section is intended for use by Facilities staff in university buildings. The following covers basic preventive maintenance of energy using equipment, calibration of HVAC and lighting systems, and operational methods necessary to fine tune buildings for maximum energy savings.

#### **General**

1. Track and monitor building energy consumption. Monitoring will increase energy awareness, help identify high usage periods, and allow for the evaluation of newly implemented conservation initiatives. The effectiveness of any energy conservation procedures or operational changes implemented must be verified and measured.
2. Assign a facility operational staff person who will have the responsibility of reviewing and verifying the utilities usage at each building.
3. Develop and implement standard procedures for reviewing, approving, and logging the monthly utility billing information.
4. Facility Managers and staff shall involve building tenants in energy conservation efforts by seeking their help, assistance, ideas, and participation in energy conservation at each building.
5. Schedule group activities in an area with the least energy use in the building. If possible schedule evening meetings in areas that can be heated and cooled individually, rather than heating or cooling the entire building. Provide work stations for staff working in off hours that can be individually heated or cooled rather than providing heat or cooling to an entire floor or building.
6. Schedule teleconferencing whenever possible. Teleconferencing can reduce energy use and save travel costs.

## HVAC (Heating, Ventilation and Air Conditioning)

1. Set **HEATING** temperatures at the following maximum temperatures:
  - 68° F to 71° F for all occupied areas and cafeterias;
  - 65° F to 67° F for all lobby corridor and restroom areas;
  - 60° F to 62° F for all storage areas and tunnels;
  - Settings for all of the above referenced spaces must be lowered to 60° F to 62° F during non-working hours;
  - 55° F for all unoccupied spaces;
  - 55° F for all vacated spaces.
  
2. Set **COOLING** temperatures at the following minimum temperatures:
  - 74° F to 78° F for all occupied space excluding reheat systems;
  - Unoccupied settings for air-conditioning, turned off or raised to 80° F during nights and weekends.
  - In implementing Part 2. above, set points should be maintained within the allowable ranges as required to achieve a target temperature of 68° F during the heating season and 74° F during the cooling season. Due to the age of various university HVAC systems and the type of temperature control systems currently in use, occupants may experience a range of temperatures within those allowed above. If the set point drops below 65° F during the winter or is above 80° F during the summer occupied hours, please submit a B & G work order as soon as possible.
  - In selected systems that use reheat, the building temperature control system may require re-commissioning to achieve the desired energy saving effect of the temperature set point range of Part 2 above. In all cases B & G energy staff will re-commission the building temperature control system to achieve energy savings and certify that the building complies with the Lincoln University Energy Conservation Program.
  
3. Computer rooms, special use facilities, and special care facilities are exempted from the heating and cooling set points given above. Additional building spaces may be exempted from all or part of these requirements, pursuant to the approval of Buildings and Grounds.
  
4. Heating and cooling should resume normal set point no sooner than 60 minutes before the scheduled opening of the building time.
  
5. Heating and cooling should be set back 30 minutes before the scheduled building closing time.
  
6. Perform all Preventive Maintenance on HVAC equipment including cleaning or replacing air handling unit filters regularly. Keep outside units free from leaves or debris that may clog the coils. Clean radiator surfaces frequently to insure a free flow of heat. Make sure that indoor heating and cooling coils are kept clean.

7. Verify that the outside air dampers close during unoccupied hours, including during morning warm-up periods. Fresh air is critical while the building is occupied, but heating outside air when it is not needed increases energy costs. If possible all fresh air handling equipment should be controlled by CO2 controls.
8. Be sure motor-operated dampers are operating properly.
9. Confirm that the adjustable speed drives are running properly. If they are operating constantly at maximum speed, they use more energy than the directly connected motor. Adjustable speed drives have an output monitor to report percentage of operation.
10. In the winter, close window coverings at the end of the day to cut down on heat loss.
11. In the summer, close window coverings during the day to avoid the heat gain of direct sunlight, except for conflicts with day lighting.
12. Do not set a higher thermostat setting to raise the temperature faster, and do not set a lower thermostat setting to lower temperature faster. This could cause the system to over-respond and waste energy.
13. Check to make sure that exhaust fans operate only during occupied periods unless required by building code or life safety code to operate continuously.
14. Check that dampers on exhaust fans close when the fan is not operating.
15. Inspect and adjust fan belt tension if necessary.
16. Inspect control schedules and zones so that the sections of the building or buildings are being controlled to their proper occupied and un-occupied set points.
17. Ensure thermostat locations represent an accurate reading of the space, if they do not; consider relocating to avoid drafts and inaccurate readings.
18. Confirm that outside air economizers are functioning properly to take advantage of free cooling. Most systems can obtain some free cooling from the outside air economizer. Free cooling in most areas of Missouri can be achieved with the ambient air conditions below 62<sup>0</sup> F. outside air temperature
19. Make sure areas with multiple units do not have re-circulation issues that cause simultaneous heating and cooling. Verify proper operation of valves, dampers and controls.
20. Monitor boiler stack temperatures. If the stack temperature is in excess of 100<sup>0</sup> F above the steam or hot water discharge temperature, schedule a tune up of the boiler burner system. On large boiler systems, annual or bi annual tune-ups may be required.

21. Turn off circulation pumps during unoccupied times if no freeze hazard conditions exist.
22. Check control sequencing for multiple chillers and boilers. For light load operation, use the smallest and most efficient chiller or boiler available to avoid frequent equipment cycling and ensuring an efficient operation.

## **Lighting**

1. Turn off all lights in unoccupied areas, excluding security, night, or emergency lights.
2. Turn off lights near windows or install light sensors to automatically shut off lights when daylight is adequate. Install occupancy sensors to automatically shut off lighting in offices when not occupied.
3. Ensure time clocks and photocells that turn on electric lights after dark are operable and set correctly.
4. Make sure time clock controlled or computerized controlled inside lighting systems are sequenced to the operational times required and are re-adjusted to daylight savings time adjustments. Make sure time clock and computer controlled inside and outside lighting systems is sequenced to the operational times and are re-adjusted to reflect daylight savings time and monthly to match dusk operation. About a minute of sun light is gained or lost each day depending on the season. You may wish to incorporate the operation of a time clock and photo cell control in series to reduce clock adjustments.
5. Use the appropriate size and the most efficient fixture and bulbs for the application.
6. Light levels should be in accordance with the “recommended luminance categories and luminance values for lighting design.” Some areas may have more lighting than required. Check lighting levels by measuring the current lighting levels and reduce excess lighting when possible.
7. Direct the janitorial services to only light the area of the building they are working in, rather than having the entire building lit (when wired to allow this). Direct them to ensure lighting is turned off as they leave an area.
8. Task lighting (desk lamps) should be high efficient fixtures. Incandescent lamps should be replaced with the most efficient fixtures and bulbs.

## **Water**

1. Incorporate low flow water measures when possible, such as low flow fixtures, faucets, and shower heads.
2. Watering landscape can waste water and electricity since water gets there with the use of electric pumps. Make sure you water landscape during early morning or late evening to avoid evaporation. Do not over-water

landscape; follow local watering guidelines for proper landscape care.

3. If possible, plant native species that require less irrigation and would reduce water and electrical energy cost.
4. Make sure landscaping water is not connected through a domestic water meter. If irrigation water system is connected through domestic water, you will pay sewer fees on this water.
5. If possible, install rain water recovery systems to be used for irrigation and gray water usages.
6. Install timers on hot water heaters to cycle off after normal hours and on weekends. Insulate hot water heaters when possible.

### **Energy Savings Programs, Projects and New Construction**

1. For comprehensive energy efficiency improvements in existing buildings, departments can utilize Lincoln University's Energy Savings Program. The program pays for itself from utility cost savings. Improvements include the following examples:
  - Building automation systems
  - Lighting upgrades
  - Lighting controls – photocells, occupancy sensors
  - HVAC upgrades
  - Water conservation
  - Energy efficient windows
  - Building envelope improvements
  - Energy efficient roofing
2. If the maintenance operating budget permits, incorporate the following:
  - Replace incandescent bulbs with energy efficient fixtures and bulbs, which can last up to nine times longer;
  - Replace the T-12 bulbs with a minimum of T-8 bulbs and electronic ballasts; Replace incandescent exit lights with LED lights, which reduce costs of operation and maintenance;
  - Install low flow water conservation showers, faucets, and toilets; Install variable speed drives on air handlers, pumps, and fans.
3. All new equipment replacement or construction must meet or exceed the most recent energy efficiency standards of the International Energy Conservation Code.
4. Confirm that the amount of outside air (OSA) matches the occupant load. Carbon dioxide monitors should be installed along with controls that will only bring in as much OSA as necessary for the current

occupant load.

5. Keep your HVAC systems tuned with periodic maintenance and measurement of the operating efficiency.
6. Always replace failed electric motors with higher efficiency motors when possible. Rebuilt electric motors will sometimes lose efficiency from their original rating.
7. B & G should review utility usage to better understand the facilities operation, identify system failure and improve on additional conservation opportunities.
8. B & G should contact utility representatives to review rate schedules and to determine if rate savings initiatives, such as load shedding or peak shaving, would be beneficial to the facilities operational utility expenditures.

#### **4. Energy Usage Tracking Action Plan**

Track energy usage in multiple buildings across campus using information from the utility company and accounts payable spreadsheet.

1. Take necessary steps through operational enhancements or other methods to improve efficiency or reduce utility consumption.
2. Provide reports for energy consumption, costs and percentage of energy savings.

#### **5. Building Equipment Retrofits and New Construction Action Plan**

The following steps mandate all new construction or replacement of energy using equipment be the most efficient that cost will allow.

1. All equipment replacement (electrical, HVAC, plumbing, water, etc.) must meet or exceed IECC, ASHRAE and Energy Star codes and standards.
2. Buildings and Grounds, along with Design and Construction will continue to investigate new energy technologies such as photovoltaic, wind, and solar, to help reduce operational costs and sustainable resources as these technologies become more cost effective.
3. Continue as budget allows using Energy Savings Contracts to upgrade inefficient equipment and building systems such as lighting, HVAC, and roofing. Adopt alternate energy sources including wind, solar, biomass boilers, woodchip boilers and ground water heat pump systems.

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