

Ag Efficiency Plus

Energy-Saving Tips



LOW-COST / NO-COST RECOMMENDATIONS

Are high energy costs affecting your business? We've provided some helpful energy-saving tips, operational and maintenance and demand response information – that may help your dairy or food processing facility reduce its energy costs.

OPERATION & MAINTENANCE

Consider the following operational and maintenance (O&M) low-cost / no-cost measures:

Lighting (including lighting in refrigeration units)

- Periodically clean all lamps, fixtures, and diffusers for maximum light output
- Turn off lights during the day in areas where day lighting is sufficient
- Turn off lights in unoccupied areas, (walk-in refrigerators, storage and break rooms), and take advantage of daylight from windows and skylights where possible
- Use photocells and timers and keep them properly set (i.e. no outside lights on during the day). Install occupancy sensors to shut off lights when rooms, hallways or lavatories are not in use.
- Install motion detector lights
- Lighter color walls and walls and ceilings reflect light better

- Install dimmable ballasts and lighting controls to enable you to control light levels
- Replace incandescent bulbs with ENERGY STAR[®] compact fluorescent lamps (CFLs)
- Use LED bulbs in exit signs instead of incandescents
- Reduce general overhead lighting by de-lamping and use task lighting where needed
- Replace T-12 fixtures with T-8s and electronic ballasts
- Replace mercury vapor lights with pulse start metal halide, high pressure sodium or T8/T5 high output fluorescents

Irrigation

- Water only when necessary
- Check nozzle package for uniform water distribution
- Test well and pump yearly
- Consider moving irrigation to off-peak hours to take advantage of lower time-of-use electric rates
- Replace nozzle package with lower pressure units and allow pump capacity to increase

Cooling and Heating

- Conduct periodic maintenance for air conditioners, including cleaning, lubricating or replacing filters, belts, bearings, condenser coils
- Check insulation on supply and return ducts and re-insulate where appropriate
- Continue to regulate thermostats as close to 78 degrees for cooling and 68 degrees for heating
- Keep doors and windows closed in conditioned areas. Keep exterior doors closed as much as possible.
- Portable electric heaters can add to your winter load, minimize their usage
- Seal off unused areas. To reduce heating and cooling bills, seal and turn off the heating or cooling in unused areas such as storage areas.

- Seal exterior cracks and holes and ensure tight-fitting windows. Seemingly small cracks or holes in the building exterior (walls, windows, doors, ceiling, and floors) can add up to substantial heating or cooling losses. Install weather stripping and caulking to stop these air leaks.
- Shade sun-exposed windows and exterior walls. In most areas of the country, direct sunlight streaming through windows during the cooling season can substantially increase your air-conditioning costs. During the cooling season, shade windows with window coverings, awnings, trees, and bushes wherever possible. Exterior shading is more effective than interior shading.
- Repaint building exterior with light colors. When you repaint areas, choose white or light colors for good lighting reflectance, especially for the roof.
- Block and insulate unneeded windows and other openings. Aside from the important security benefit, covering unneeded windows and doors can greatly reduce energy losses from these openings.
- Set thermostat to 78 degrees. Where nighttime outside temperature is cool, use ventilation fan(s) only at night, to cool the building. If not using ventilation to cool the building, shut off fans during unoccupied hours.
- Set makeup air duct thermostat to 55 degrees
- In winter, open shades and blinds during daylight hours. In summer, close blinds exposed to direct sunlight (east-facing in the morning; south-facing in the mid-day, west-facing in the afternoon).
- Make sure doors and windows have tight seals and keep them closed when running your air conditioning system
- Turn off exhaust hoods and lights when not needed and install variable speed controls
- As areas are vacated, turn off cooling systems; turn off fans when the building is not in use
- Install ENERGY STAR® programmable thermostats and locking covers to prevent tampering; clean dust from thermostats
- Properly insulate all exterior walls, ceilings, and wall cavities
- Consider landscaping such as trees and awning for shading devices
- Use ENERGY STAR® roofing material with high reflectance
- When replacing heating or cooling systems, choose ENERGY STAR® equipment
- Check outside "air economizers" for proper operation and set them to maximize "free cooling". However, broken economizers can waste energy.

- Check equipment regularly (evaporative coolers, fans, pumps, pads, burners, coils, air filters, ducts, etc.) for proper operation and maintenance needs
- Use attic fans or evaporative coolers in place of, or to reduce, the use of air conditioners
- Set air-handling equipment to cycle with compressor(s) or to cycle as required
- Treat cooling tower water to eliminate corrosion and blockage
- Ventilate internal heating sources in a loop to the outside, separate from conditioned air
- Raise the chilled water temperature for chillers
- Balance air-handling system to prevent cooling loss
- Remove scale from heat-exchange vessels
- If windows or door rattle, this may mean weatherstripping is deteriorating and should be replaced
- Turn pilot off during summer or use intermittent ignition devices (IIDs)
- Verify that heating and cooling cannot operate simultaneously
- Lower boiler water temperature whenever possible

Refrigeration

- Conduct periodic maintenance for the refrigeration equipment, including cleaning of evaporator and condenser coils
- Check insulation on supply and return refrigeration lines and re-insulate where appropriate
- Shelf products properly to avoid airflow blockage or voids
- Check for misaligned frames and hardware
- Maintain room temperature at 75 degrees dry-bulb and 55% relative humidity
- Check temperature and humidity sensors annually
- Install vending machine controllers for refrigerated drink machines to periodically cycle off the compressor and lighting



Motors

- As you purchase new motors or replacement motors, make sure you purchase premium efficiency models, see <http://www.nema.org/gov/energy/efficiency/premium/>
- Select the right size for the job. Avoid over-sizing or under-sizing motors. Locate motors in the coolest, cleanest and driest environment possible.
- Inspect all motors on a regular basis. Clean whenever needed, which may be monthly in some environments. Use oil sparingly. Follow manufacturer's instructions.
- Maintain proper belt tension and pulley alignment
- Avoid overloading (and overheating) by cleaning refrigerating condenser coils and ventilation fan blades and shutters on a monthly basis
- When motors are replaced or rewound, use premium efficient motors
- Replace V-type belts with notched belts
- Check for failed fan motors on evaporator and condenser belts

Ventilation Fans

- Disconnect power to the fan before cleaning and use a lock or other means to ensure that no one will accidentally turn on the fan
- Remove all dust accumulated on controls and motors using a small blower, vacuum, or stiff brush
- Remove all dust and mud build-up from fan blades, guards, motors, exhaust shutters, cones and inlets using a warm detergent solution. Thoroughly dry the fan parts before operating.
- Lubricate all pivot points of shutters and inlets using fine grade machine oil or graphite. (Note: most fan motors don't require lubrication because their bearings are sealed.)
- Check all wiring from the service entrance box to each point of use. Make sure there is a good ground at the service entrance. Employ a qualified electrician for repair or replacement of poor wiring system components.
- For belt-driven fans, make sure that pulleys are properly aligned and that the belt has proper tension
- Cover unused fans with plastic or insulated panels; disconnect power to fans
- For motors without built-in overload protection, check the size of the time delay fuse. It should be no larger than 120% of the motor nameplate current rating.
- Reattach all guards before turning the power back on
- Check the thermostat with a reliable thermometer

- If any auxiliary heat is controlled by a thermostat, make sure that the temperature difference between the heating and ventilation settings is adjusted to optimize energy use

Domestic Hot Water

- Repair all hot water leaks and leaky faucets
- Reduce the hot water temperature. Reducing the temperature on your water heater thermostat can decrease heat loss from your tank. For washing hands, you may be able to turn the temperature to 110°F. Dish-washing may require higher temperature settings such as 130°F. Dairy farms require a minimum detergent wash solution temperature of 120°F when the solution is dumped to drain.
- Install flow restrictors and aerators in sink faucets. By reducing hot water used, aerators and restrictors save money by reducing water use and electricity.
- Purge water heater tanks monthly. This is especially important in "hard water" areas where softeners are not used.
- If economical, install a refrigerant heat recovery system to use waste heat from refrigeration units to preheat hot water
- Install a timer on circulator pumps so they don't operate 24-hours
- Insulate all hot and cold water pipes
- Remove scale from heat-exchange surfaces
- Insulate hot water tanks
- Install a heat trap above the water heater to prevent thermosiphoning
- Turn off water heaters if not used for long time periods
- Tune up milking system's washing system
- Appropriately size milklines; oversized milk pipelines require more water to wash
- If possible, reuse pre-warmed water from plate cooler to wash down equipment; pre-rinse water temperatures are recommended at 110°F
- Use a cold acid rinse cycle

Equipment

- Create a start-up and shutdown schedule for appliances (coffee machines, heat lamps, etc.), only run dishwasher with full loads
- Turn off computers, monitors, printers, copiers, fax machines, etc. at the end of the day, and turn off desk lamps, fans, and coffee makers when not in use

- Activate “sleep” mode on computers and other office equipment
- Maintain refrigerator door seals, clean condenser and coils monthly, and defrost appropriately
- Purchase energy-efficient appliances such as reach-in refrigerators and freezers, insulated food holding cabinets and electric fryers, induction cook tops and water-conserving dishwashers for multiple savings
- As areas are vacated, turn off equipment that is not needed (such as computers, copiers, fax machines, personal heaters, fans, radios, etc.)

DEMAND RESPONSE RECOMMENDATIONS

Below are actions you can voluntarily take when electric system loads and demands are high. You will hear announcements on the news, etc. when these situations are expected to occur.

Lighting

- Turn off lights in areas where daylight will suffice and in unoccupied areas
- In areas that are double switched, turn off a portion of the lamps
- Turn off lights in unoccupied areas
- Turn off overhead lighting; use task lighting only
- Turn off lights in hallways and lobbies
- Use daylight in the afternoon and turn off unneeded lighting

Air Conditioning

- Consider participation in Southern California Edison’s Commercial Summer Discount Program for some or all of your package air conditioners and heat pumps
- Turn off units not needed and raise temperatures where possible
- Lower thermostats in winter, raise thermostats in summer
- Turn heating and cooling systems off if not needed Pre-cool facilities by a few degrees before noon

Miscellaneous

- Use laptop computer from battery power
- Turn off unused computers, copiers, fax machines
- Turn off personal heaters, fans, radios
- Develop a response plan to reduce loads when Edison calls on the resources

- When possible, avoid charging of the electric forklifts during the summer on-peak hours (weekdays 12 Noon-6 pm, the first Sunday in June through the first Sunday in October). Forklift chargers may have programmable controls to do this automatically
- For more information on Edison’s Demand Response Programs see: <http://www.sce.com/RebatesandSavings/LargeBusiness/DemandResponse/default.htm?goto=drp/>

Federal Tax Deductions

Owners and designers of commercial buildings can reduce their tax liability by building and designing more efficient buildings. **For more information see:**

<http://energytaxincentives.org>

<http://www.energytaxincentives.org/tiap-commercial-bldgs.html>

http://www.efficientbuildings.org/about_the_provision.html

Proper Ballast and Lamp Recycling / Disposal

Lamps and ballasts removed as part of a lighting system upgrade or as part of normal maintenance may be a hazardous material. Government regulations, health and safety issues, and environmental concerns dictate that lamps and ballasts be recycled or disposed of properly. CA law requires all mercury-containing lamps must be recycled.

For more information see:

California Department of Toxic Substances Control
<http://www.dtsc.ca.gov/HazardousWaste/UniversalWaste/index.cfm>

Association of Lighting and Mercury Recyclers
<http://www.almr.org/>

Lamprecycle.org <http://www.lamprecycle.org/>

More Information

For a detailed list of suggested O&M and energy-efficiency measures, call Ag Efficiency Plus at 1-800-791-7541

