

## **No Cost/ Low Cost Energy Savings tips for Industry**

### **Heating, Ventilation and Air Conditioning**

#### **No Cost**

- Alter settings of heating and cooling systems seasonally to save 1 to 3% of cooling or heating costs for each degree the thermostat is raised or lowered. Ask staff and other occupants to find the temperature that is most comfortable and best meets other climate control requirements. You may find that some areas are warmer or cooler than they need to be.
- During the summer, set the thermostat to 76 - 78°F or higher when the workplace is occupied, and 85° F or off after business hours.
- During the winter, set the thermostat to 68 - 70° F when the work place is occupied and 63°F after business hours.
- Adjust workplace schedules to reduce energy use during the hours when there is most demand for electricity. If employees start work earlier or have lunch during the hottest hour of the day, a company can save on air conditioning, lighting and other electricity use during the hours of peak electricity demand.
- Prevent solar entry and air-conditioning loss during the summer. Use shades and blinds to keep the sun out. Close doors to the outside to keep in cooler air.

#### **Low Cost**

- Perform regular maintenance to keep heating, ventilation and air conditioning (HVAC) systems running more efficiently. Maintenance activities can save up to 30% of fan energy and up to 10% of space conditioning energy use.
- Install an energy-efficient attic fan or evaporative cooler. Attic fans or evaporative coolers help reduce or replace air conditioner use.
- Reduce air conditioning and heating hours by installing a time clock to turn off the system when the building is unoccupied.
- Perform regular maintenance on cooling equipment. Regularly clean condenser coils, change belts and filters and fix duct leaks. Also check for proper economizer operation and adequate refrigerant levels. Maintenance activities can save up to 30% of fan energy and up to 10% of space conditioning energy use.
- Add controls to the exhaust fan. These fans remove air you have already paid to cool. Ask your air conditioning contractor to install timers and switches to shut them off when they are not needed, such as when the building is unoccupied.

## **Motors & Drives**

### **No Cost**

- Eliminate bypass loops and other unnecessary flows. This produces a systems savings of 10 to 20%.

### **Good Investment**

- Install premium or high efficiency motors. This measure saves up to 3% of energy use.
- Install timers, level sensors, material sensors or other controls for automatic operation and/or to shut off equipment as required.
- Replace oversized motors with properly sized energy efficient motors. Motors consume the least amount of energy when they operate at their highest efficiency.
- Replace throttle controls with a solid-state variable system drive control and fan discharges with inlet vane controls. These measures can save as much 50% of system energy.
- Install parallel systems for highly variable loads. This can save as much as 30% savings in energy use.
- Conduct regular maintenance checks. Plugging leaks and maintaining system balances can yield up to 30% of systems energy savings.

## **Steam Equipment**

### **No Cost**

- Insulate steam and condensate return lines and ensure proper boiler and pipe insulation. Insulation can typically reduce total facility energy consumption by 1% and help ensure proper steam pressure at plant equipment.
- Check and maintain steam traps. In systems with a regularly scheduled trap maintenance program, a facility can save 2% of its total energy use and 10 to 20% of the boiler's fuel use.
- Implement boiler load management techniques. For example, operating on high fire settings or installing smaller boilers can save more than 7% of a typical facility's total energy use.

## **Compressed Air System**

### **No Cost**

- Listen for and locate air leaks in compressed air lines and equipment fittings. Repair the loudest leaks first. Repairing air leaks reduce the system's electrical usage by 15 to 40%.

- Assure the compressed air system does not run when plant is not in use (i.e., overnight or on the weekends). Use smaller air compressors dedicated to serve minimal after-hour needs. These actions can save up to 20% of a system's electricity usage.
- Do not use compressed air for cleaning purposes. Use blowers or hand sweeping, which can save up to 10% of compressed air system usage.
- Use the load-unload valve controls to moderate compressor output capacity. Adjusting controls can reduce compressed air system energy use by about 10%.
- Reduce the discharge pressure to the minimum required by the system.

### **Good Investment**

- Install air storage strategically to minimize system horsepower requirements and improve delivery of air. This measure can reduce the system's electricity usage by 15 to 35%.
- Install variable speed drives on compressors. Savings are approximately 10%.
- Make sure multiple compressors are sequenced using automatic sequencing controls. Shutoff timers should be used on all air compressors. Installing microprocessor controls on compressor systems can yield savings in the 2% to 4% range.
- Ensure the compressor is on a regular maintenance schedule. Regular maintenance can yield savings as high as 30% in reduced energy use.

## **Process Cooling and Refrigeration**

### **No Cost**

- Consolidate loads with similar suction requirements.
- Eliminate heat losses from leaks and improper defrosting. This action can reduce refrigeration system energy use by 10 to 20%.
- Freeze products in batches rather than continuously. This measure can reduce freezing process energy use by up to 20%.
- Consider load shifting during periods of high-energy use and/or using thermal storage during periods of low-energy use to reduce the total energy demand.
- Set the system to operate at lower head pressures. (Minimize the lift.)

### **Low Cost**

- Perform scheduled maintenance on refrigeration units. Regular maintenance can yield savings as high as 30% in reduced energy use.

### **Good Investment**

- Install high efficiency evaporator and condenser fan motors. Energy savings estimates range from about 3% to 9% per refrigeration system.
- Energy-efficient defrost systems improve the operation of the defrost cycle. Demand controls, which initiate defrosting in a variety of ways, can save 1 to 6% of refrigeration system energy use.

- Invest in mechanical subcooling — an effective method of cooling liquid refrigerant below saturation pressure in order to increase system capacity and improve efficiency. Energy savings can be achieved up to 25%.
- Installing variable speed drives in place of constant speed drives can reduce cooling system energy use by 30% to 50%, depending on load profile.

## **Process Heating**

### **No Cost**

- Clean heat transfer surfaces frequently of indirectly heated systems, such as steam coils, radiant tubes and electrical elements. This measure can save between 5 and 15% of energy use.
- Preheat combustion air and preheat and/or dry the charge load. Cascade heat from exhaust gases to the lower temperature equipment for savings of 10 to 25% of current use and as much as 3% of a facility's total energy use.
- Develop procedures for regular operation, calibration and maintenance of sensors and controllers. Regular maintenance can result in energy savings of as much as 10%.
- Set appropriate operating temperatures for part load operations to avoid long "soak" or overheating. This action can save up to 10% of current energy use.

### **Good Investment:**

- Optimize heat transfer by selecting burners and design furnaces that allow use of high convection or radiation. Also replace indirectly heated systems such as radiant tubes. Energy savings potential is up to 25% of current use.
- Use adequate and optimum insulation for process heating equipment and conduct regular repair and maintenance of insulation. These measures can save between 2 and 15% of current energy use.
- Use improved materials, design and applications of load support such as fixtures, trays and baskets, to reduce nonproductive loads. These upgrades can save up to 25% of a system's energy usage.
- Use direct natural gas firing instead of indirect steam heating. This measure can save 33 to 45% of the energy used by a process heating system.
- Use direct electric heating (infrared, microwave or dielectric).

### **Sources:**

**[http://www.michigan.gov/deq/0,1607,7-135-3585\\_30068\\_30172-12346--,00.html#Top](http://www.michigan.gov/deq/0,1607,7-135-3585_30068_30172-12346--,00.html#Top)**

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