

# BUILDING A BUSINESS

## Save on summer cooling bills

Heating, ventilation, and cooling accounts for roughly half the energy consumed in school buildings and homes. It pays to examine your use of HVAC systems to control costs and ensure health and safety.

As a first step, gather utility bills for the past 12 to 24 months. Make a graph, with dollar amount on the left and months across the bottom. Notice when costs are highest and lowest. When might you turn off HVAC systems and open windows? File the graph to use as a benchmark in analyzing savings.

## Look at the building

Many child care operations have little control over the

steps toward energy efficiency.

The most common HVAC systems are central air systems. They force cooled air (heated air in winter) through ducts in a continuous loop through the building.

A cooling system consists of 1) a compressor or condensing coil outside and 2) an air handler or evaporating coil on the inside. The two are connected by tubes that carry a refrigerant.

Indoors the conditioned air loops from the air handler through the indoor space and back to the air handler. Every time air passes through the air handler, it loses heat to the refrigerant. The heat is released to the condensing unit outside.

opens whenever the air handler runs or by a timer.

Some tips:

- Know the location of your inside units and all supply and return air grills.
- Be sure there is good air flow around the compressor outside. You might erect a wire fence to keep children away from it, but don't enclose it in a box or plant anything within 3 feet of it. The heat coming out needs room to disperse.
- Check for air leaks. Caulk the holes around outlets, wires, and pipes. Make sure doors and windows close tightly, are well caulked, and have adequate weatherstripping. Check ducts leading into the air handler and at other accessible locations.
- Consider installing exterior solar screens. These screens, attached to outside window frames, can save up to a third on summer heating bills. They are less expensive than awnings and more effective than interior blinds or shades because they prevent heat from getting inside. They can be removed in winter or anytime for cleaning.

## Three important tests

If you're thinking about moving into a different facility or considering whether to renew a lease, ask for three tests for air leaks. These tests should be performed by experienced professionals. Your utility company may offer the tests free or at a discount.

- **Duct leakage.** Ducts can become disconnected, cracked, and crushed and have problems with insulation. Leaks can be sealed with a material, like latex mastic, that won't deteriorate over time.
- **Blower door.** Air will leak through any crack in the insulated outer shell of the building, such as between siding boards. Cracks can be covered with insulation, caulking, and weatherstripping. The more extreme the climate, the more important it is to control leakage.
- **Safety backdraft.** Combustion gases from a gas water heater or gas furnace should move out of the vent pipes and exhaust to the outside. If not, the gases could backdraft and harm people.

In newly constructed facilities, talk to the builder about repairing these leaks. In older buildings, the leaks may be inaccessible or require major renovation. If it would take too long to recoup repair costs from savings on utility bills, you might want to look elsewhere for space.

buildings they use. They may be old or poorly designed, and remodeling can be expensive and complex. Even so, you can take some simple and low-cost

The HVAC system may also have a built-in ventilation mechanism to allow an occasional intake of fresh air. A damper, or mechanical valve,

## Prepare for the summer

HVAC systems will run better and last longer if they are properly maintained. Arrange for yearly HVAC service in the spring. A technician should:

- clean the air fins and the condensing and evaporating coils,
- check the compressor's electrical load (amperage draw),
- oil the fan motors and check belts,
- check the damper operation,
- check thermostats and recalibrate if necessary, and

- check operating pressures and temperatures to ensure they comply with the manufacturer's recommendations.

### Control for comfort

Feeling comfortable depends on several factors, not just the air temperature but also relative humidity and air movement.

**Humidity.** The cooling system goes on or off according to changes in temperature. The system also reduces humidity as it runs. But most systems don't start lowering humidity until after they've been running about 10 minutes. So if you live in a hot, humid climate, the run cycle should last long enough to lower both the temperature and the humidity.

Unfortunately many buildings and homes have large systems that cool the air quickly and then shut off. The air is cool but if the humidity is high, you may still feel clammy. Furthermore, if the humidity rises above 60 percent, molds grow, which could make people sick.

A properly sized unit is large enough to cool the space in a reasonable time and small enough to run in long cycles so it has time to dehumidify the air. By running longer cycles, the system runs more efficiently and exerts less strain on the compressor. And a smaller unit costs less to run.

You may not be able to do much about humidity until your cooling unit needs to be replaced. When it does, make sure your HVAC contractor does a load calculation to figure the right number of AC tons for your building. Also make sure the AC unit carries an Energy

Star label, which means it has met strict energy efficiency guidelines set by the federal government.

**Thermostat setting.** Many facilities set room thermostats at 78 degrees in summer (and 68 degrees in winter). When the building is unoccupied, raise the thermostat setting.

If the weather is hot and humid, however, turning off units is not advised. When the space gets too hot, the unit may not be able to cool the space in a reasonable time when you turn it back on. More important, a humidity above 60 percent will promote mold growth.

Consider installing programmable thermostats. These cost \$50 to \$200 each, but are well worth the cost in energy savings. Your HVAC technician can install and program the thermostats to fit your schedule. Make sure teachers know how to operate them, however, so they can adjust the setting for a night or weekend event.

**Air movement.** Consider installing ceiling fans. They don't actually make the air cooler, but the moving air makes people feel cooler. Prices start at \$50 and vary by size and style. Fans cost about the same to run as a 100-watt light bulb. Clean fan blades at least once a year.

### Change filters often

AC filters pick up dust, pollen, and other particles. A dirty filter impedes air flow and diminishes air quality. Left for too long, a dirty filter can clog the blower and cooling coil and cause it to wear out prematurely.

Determine which filters are best for your needs. Do children and staff have respiratory

problems such as allergies and asthma? Is your building next to a highway or construction site? If you care for children in your home and have pets, pet dander and hair could be a problem.

Look for the filter's MERV rating (Minimum Efficiency Reporting Value). This tells you the filter's ability to capture particles between 3 microns (the size of a human hair) and 10 microns on a scale of 1 to 16. The higher the number, the better. The cheapest filters capture only larger particles of 10 microns or more, such as pollen and dust mites. Pleated media filters, by contrast, capture smaller particles of 3 to 10 microns, such as mold spores.

Check filters every month. Establish a schedule for changing them, and appoint a person to be responsible for the task. Cheaper filters need to be changed more often.

### For more information

Austin Energy Green Builder Program. Fact sheets.  
[www.ci.austin.tx.us/green-builder/fs\\_toc.htm/](http://www.ci.austin.tx.us/green-builder/fs_toc.htm/).

Princeton Energy Resources International. August 2004. School Operations and Maintenance: Best Practices for Controlling Energy Costs. Prepared for U.S. Department of Energy. Available at Alliance to Save Energy, <http://www.ase.org/content/article/detail/1806/>.