



CONTROL ENERGY COSTS

by winterizing your greenhouse

Employing energy efficiency practices before winter arrives can reduce your business' energy costs.

By Thomas Richey

Energy costs are the second largest expense for today's greenhouse businesses, just behind labor. Heating, specifically, can represent 70-80 percent of a greenhouse business' total energy budget, depending on geographic location. With that reliance on heating energy, increased energy costs over the past few years have hit the horticultural industry hard.

According to the U.S. Department of Energy, the national average prices for key fuel sources for the industry have risen steadily since 2003: Electricity is up 7.7 percent; natural gas has risen 33.8 percent and propane prices have increased 29.9 percent. Particularly hard hit are greenhouse businesses in the Northeast and Midwest, where erratic weather patterns can mean sustained sub-freezing spells and heavy snow.

One strategy greenhouse operators can take to minimize the cost of rising fuel prices is to winterize their greenhouses. Taking the time

Energy curtains are proven to reduce the heat loss in greenhouses up to 70 percent when the curtains are closed.

to winterize a facility not only benefits the operation's internal environment, it also benefits a company's bottom line.

The following practices can be done to and around a greenhouse to reduce the impact of higher energy costs before winter sets in. Some are as simple as a trip to the hardware store, a modest purchase price and a quick installation. Others require a greater investment, but promise a return for years ahead.

Invest in insulation

Insulate the greenhouse sidewalls and end walls with 1- to 2-inch foam insulation board, if a bench system is in place. It is preferable that the insulation board is dug in 12 to 24 inches deep and is extended to the plant height. Spray-on foam is another good way to provide excellent insulation.

It has been calculated that two inches of foam insulation around the knee walls of a 28- by 100-foot greenhouse can save about 400 gallons of fuel oil, 610 gallons of propane or 558 therms of natural gas per year depending on your fuel source.

In order not to overheat boiler rooms or head houses, be sure that all pipes and air ducts that run through the greenhouses are well insulated. Insulation is cheap, easy to install and available in a variety of shapes and sizes. Return on an insulation investment is usually less



Heating systems and controls should be cleaned and checked annually.

The more porous the curtain, the less efficient it will be. However, porous curtains can serve a dual purpose providing heat retention in the winter and shading in the summer. Non-porous aluminized material used for a curtain provides the greatest insulation factor and the greatest savings.

Weather stripping and caulking

Weather stripping and caulking around doors and vents reduce heat loss and

Polyurethane and polysulphide caulks offer high adhesive properties. Compound-type caulks offer the best of both silicone caulks and polyurethane/polysulphide caulks.

Weather stripping, most commonly the foam-adhesive type, costs very little in relation to the amount of energy that it saves.

Heating systems, controls

Heating systems and controls should be cleaned and checked annually. All thermostats should be calibrated yearly. If you purchase new thermostats, install the electronic models with a 1°F differential.

Replace older, less efficient furnaces. If a furnace is more than 15 years old, consider a replacement. Don't wait for a furnace to fail.

Newer, more energy efficient technology furnaces save money in the long run. Rebates, tax credits and financing programs offered by some states can save money at the time of purchase.

Increasing a heating system's efficiency by as little as 4 percent will save about 250 gallons of heating oil, 389 gallons of propane or 388 therms of

Each uninsulated linear foot of 2-inch heating supply pipe will lose about \$4 worth of heat this winter.

than two years. Each uninsulated linear foot of a 2-inch heating supply pipe will lose \$4 worth of heat this winter.

Energy curtains

Energy curtains are proven to reduce the heat loss in greenhouses up to 70 percent when the curtains are closed. There are several types of curtains (blankets) available on the market today.

eliminate cold spots throughout the greenhouse. Be sure to replace gaskets and caulk around joints and other openings in the greenhouse shell.

When choosing a caulk for winterizing the greenhouse, select one that remains flexible. Silicone caulks are the most popular because they stay flexible for a long time, but cheaper brands are susceptible to mold growth.

natural gas per year in a 2,800-square-foot greenhouse.

Wind breaks

Wind breaks obstruct and redirect the flow of wind. Wind striking an obstruction will move over, around or through it.

Wind breaks in open areas in the path of prevailing winds help reduce infiltration losses, thereby reducing energy costs.

There are many man-made and natural types of wind breaks that can be used, including 10- to 12-foot snow fence, or rows of deciduous and evergreen trees

upwind of a greenhouse. Impenetrable wind breaks, however, are not recommended, as they can create a strong vacuum on the protected side, which effectively reduces protection.

Greenhouse glazing

If a greenhouse is covered with inflated double polyethylene film, use an infrared-treated film on the inside to reduce thermal radiation loss. By using an IR/anti-condensation film, an energy reduction from 15-20 percent will be realized versus using an untreated film.

Glass structures inherently have more infiltration because of the numerous joints involved. Simply attaching a single layer of film inside a glass greenhouse reduces heat loss and infiltration in the structure. Consequently, reducing infiltration increases the humidity level and may cause the rapid depletion of carbon dioxide. Mechanical ventilation may be needed to offset this depletion.

Central environmental control system

A computerized control system coupled with a weather station can control the different operating parameters required for normal greenhouse operation. Changes such as increased wind speed or rain can be anticipated and vents can be closed. Low solar levels during cold weather may dictate closing thermal blankets and turning on supplemental lighting.

These systems can alert personnel to equipment failures or operating parameters that are outside control limits through an audible alarm, warning light or telephone call.

These control systems save energy due to smaller differential ranges in temperature, light and humidity. These systems have safeguards that ensure the fans and the heating systems aren't running at the same time and anticipate changes that reduce energy input and increase plant growth. 🌱

Thomas Richey is vice president Loss Control/Property Claims, Hortica Insurance & Employee Benefits, (800) 851-7740; www.hortica-insurance.com.