

Climate Screens for Considerable Savings in the Greenhouse

During the holiday season, we spend money on gifts for our loved ones and on transport costs to go visit them, often not considering the full extent of such costs until January's credit card statement. In a similar way, energy costs are a prominent feature of greenhouse management that aren't always considered until the bills come due. While presently the cost of gas for heating and electricity for lighting may not be at a historic high, investments in energy conservation by growers can lead to long-term cost savings.

Greenhouse climate considerations

Aside from labor, the energy cost associated with controlling climate is typically the largest expense of a commercial greenhouse and often the grower's largest worry. Maintaining one's greenhouse climate as close to the desired ideal for a given crop will help to maximize the crop's growth and yield, and aide in the control of pests.



Pictured: Energy curtains can provide versatile options and can be used for summer shading or to diffuse the light creating a more even and deeper light spread.

Temperature, humidity, light intensity and carbon dioxide concentrations are the main elements of the greenhouse climate. These are all impacted by the exterior climate, the greenhouse conditions and the plant conditions—namely the transpiration rate. Simply put, a grower must seek to control their greenhouse conditions—from the ventilation, HVAC systems, lighting and other components that the grower has an influence over—to optimize the temperature, light and humidity for their crop. These, in turn, affect the crop's photosynthetic rate, respiration and transpiration. Greenhouse climate screens, or curtains can serve as important regulators of greenhouse conditions and can have a strong effect on both light and heat, which can be extremely effective in improving crop quality and uniformity, and contribute to shorter production times.

Climate Screens and cost savings

In general, climate screens or energy/shade curtains affect the incoming light transmission and heat retention within a greenhouse—both factors that greatly affect a greenhouse's total energy usage. While greenhouse curtains represent an upfront expense, they typically pay for themselves in energy savings in three to five years, and sometimes in as few as 18 months.

On a month-to-month basis, the total energy costs associated with a commercial greenhouse may be reduced 25% to 40% with the use of climate screens. In addition, their proper use will help to optimize the overall climate in a greenhouse, which will lessen the intensity and cost of crop management activities such as watering, spraying and pruning, and possibly save the grower in labor costs.

Climate screens are intended to last for seven to 10 years with proper installation and often function quite well beyond this time frame. They're as important of a component of a grower's greenhouse climate control as the house's other physical components, such as the floor, side and end wall, and ceiling materials.

Climate screen selection for added savings

As previously mentioned, screens affect greenhouse climate through their effects on light transmission and in the retention of heat within the house. Some screen types are designed specifically to impact one method, while others are more multifunctional and may address both light transmission and heat retention.

There are traditional aluminum-stripped shade curtains, as well as transparent energy screens, meant for energy retention, which allow for maximum levels of light transmission. Many greenhouses commonly rely on screens with the ability to provide versatile options. For example, energy screens that provide some extent of shading allow for both heat retention during colder months and UV protection in warmer periods.

Light-diffusing climate screens have become an increasingly popular option in recent years. There are multiple benefits associated with diffuse light, including a more even distribution of light in the greenhouse, faster crop growth and healthier plants.

If a grower desires screens for multiple uses, it's often possible to utilize two separate screens in a greenhouse. For example, a light diffusion screen could be paired with a transparent energy screen to manage both energy and light diffusion over the same crop.

Installing and utilizing climate screens

The first consideration in utilizing climate screens for saving on greenhouse energy costs is selecting the appropriate curtain or curtains for your greenhouse. This selection will be dependent on the exterior climate in your region, as well as your goals for climate control within the greenhouses and, of course, the crops.

Upfront costs must be taken into account, but in determining budgets, it's important to analyze the potential cost savings that will be achieved over time by installing and utilizing climate screens. A number of energy calculators and other programs exist that can help growers in quantifying these costs and thus the benefits of individual types of greenhouse climate screens.

Second, proper installation of screens is vital to maximizing their cost-saving utility. Too often overlooked is the importance of good seals between the screen and the sidewall material and the screen panels' leading and trailing edges. When the screen panels are fully extended, the air in the greenhouse attic should be completely separate from the air of the growing area beneath it. Failing to provide this barrier can reduce the energy-saving capacity of the screen by up to two-thirds.

The mechanical system of the screen panels should ensure a tight seal between the panels' leading and trailing edges. Panel perimeter edges are typically sealed by fabric boots on their ends or pockets along the sidewalls. Consideration must also be paid to the proximity of the climate screen to other components of the greenhouse that can cause damage to the screen, such as unit

heaters and HAV fans.

Lastly, growers must become educated on the proper usage of their climate screens, including duration and time of use. A shade screen providing a high shading percentage is appropriately used during times where lessening light transmission in the greenhouse is suitable, such as in the middle of the day during warmer, sunnier months when the greenhouse temperature may exceed what is optimal for the crop.

Conversely, an energy screen installed primarily for heat retention is best deployed when the retention is more important than the light transmission lost. Often, this is simple if the energy curtain is to be used to retain heat in the greenhouse and prevent condensation at night—more complicated is determining at what point the screen should be reopened in the morning and closed in the evening.

Having double-layer screens in a greenhouse gives the grower much greater control and flexibility over managing the climate. However, the grower must consider the use of two screens either separately or in tandem, complicating the deployment decisions that must be made.

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