

GROWERTALKS

Features

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Are You Heating the County? How to Reduce Greenhouse Heat Loss

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When you take a closer look at where your heat is going, you may find more of it is making its way outdoors than you think. With so much of typical annual energy use going toward heating—about 75%, in fact—even small heat losses can add up quickly.

Where your heat makes its escape

But you can't fix a heat leak until you find it. Heat mainly escapes the greenhouse by passing through glazing and other building components or flowing out through gaps or openings while cold air seeps in.

So when we talk about air infiltration, particularly regarding maintaining greenhouse temperatures when outdoor conditions are too cold, preventing cold air from entering your greenhouse is just as important as keeping warm air from exiting. Plugging your leaks solves both problems.

Some of the biggest culprits for heat loss include:

- Exhaust fan shutters and louvers that don't close fully
- Roof and sidewall vents with gaps around them
- Drafty doors and other openings
- Foundations lacking proper insulation
- Glazing cracks and seams

Once you've found leaks, repair them. The savings from tightening up your house can cut your heating bills by 5% to 10%, according to Penn State Extension's estimates.

22 ways to reduce greenhouse heat loss

Some of the most effective heat-loss fixes are simple and immediate. These repairs require a little time, but very little money. Prepare your greenhouse for cooler temperatures by addressing the places where heat escapes and cold air seeps in.

Glazing/cladding:

1. Inspect your glazing for holes and patch them.
2. Replace any cracked, broken or missing panels.
3. Check double-poly greenhouses for proper inflation. Make sure the blower maintains enough air pressure to

keep the two layers separated.

4. Clean your glazing to maximize light transmission and solar heat gain.

Doors, vents & other openings:

5. Look for gaps around doors, vents and other openings. Add weatherstripping or caulk to seal the gaps.
6. Make certain all vents close completely. Repair any bent rack-and-pinion arms.
7. Check for louvers/shutters that don't close properly.

Insulation:

8. Cover unused or seasonal exhaust fans with plastic or foam board insulation.
9. Insulate greenhouse walls in areas where light transmission isn't important.
10. Insulate knee walls or foundation walls up to bench height with foam board.
11. Add perimeter insulation to reduce heat loss around the greenhouse base.



Foundation & perimeter:

12. Seal cracks in the foundation with flexible caulk.
13. Take care of any gaps between the greenhouse walls and the floor.
14. Plug spaces where the glazing meets the kneewall.

Preventing cold air from entering your greenhouse is just as important as keeping warm air from exiting.

Energy screens & curtains:

15. Inspect energy screens for holes, tears and threadbare material. Make repairs as needed.
16. Assess energy screens to confirm tight edge closures and adjust cables as needed.

Heating system:

17. Inspect boiler(s) and unit heaters for clogs or malfunctions.
18. Test for and repair any leaks in your heating system.
19. Check insulation on the outside of your pipes. Repair any damage or

replace if necessary.

Sensors:

20. Check temperature sensors for accuracy and recalibrate as needed.

Other:

21. Inspect and tighten loose bolts and fasteners.
22. Clean fan blades to maintain efficient airflow.

You'll find that many of these repairs become unnecessary if you keep up with regular greenhouse maintenance.

Long-term investments for lasting energy savings

Once you've handled the immediate fixes, consider improvements that can reduce heating demand well into the future.

1. Install radiant bench heating. The heat goes directly where it's needed instead of leaving things to chance.

2. Build gutter-connected greenhouses. They share internal walls, which means they have less exterior walls exposed to the elements. There's less surface area for heat to escape through the glazing.

Prospiant 280.jpg: Gutter-connected greenhouses share internal walls, which means they have less exterior walls exposed to the elements.



3. Pay attention to U-values and R-values. Simply put, R-value measures the resistance of a glazing material to heat transfer, while U-value measures how quickly heat moves through the glazing material. When selecting glazing, you want the highest R-value and the lowest U-value possible to lower heating costs.

Gutter-connected greenhouses share internal walls, which means they have less exterior walls exposed to the elements.

4. Put on some layers. Multi-wall glazing, such as twin-wall polycarbonate with two outer layers separated by vertical supports, trap air between their layers. Because dead air conducts heat poorly, the air spaces form a thermal barrier that reduces heat transfer.

5. Insulate below the plant level. Adding insulation keeps heat inside without blocking the sunlight your plants need.

6. Install a screen system. Closed climate screens create a pocket of air above the growing space that reduces indirect heat transfer. They also reduce the amount of space you need to heat. Close your screens at night to retain heat gained during the day.

7. Set up windbreaks. Strong winds increase heat loss through coverings by carrying heat away from the outside surface. Windbreaks can reduce wind exposure, but place them far enough away to avoid shading the greenhouse.

8. Upgrade from unit heaters to a condensing boiler system. Condensing boilers recover heat from exhaust gases that would otherwise leave through the vent stack. They can also circulate hot water through under-the-bench, in-floor or root-zone pipes, placing heat closer to the crop. Heating the root-zone also allows you to lower the overall ambient air temperature while still maintaining suitable crop temperatures.



Keep the greenhouse heat you're paying for

We often treat greenhouse leaks as out-of-sight, out-of-mind problems best left for another day. But consider this: You can keep pouring water into a leaky bucket, but it'll take a lot more water to maintain the water level.

Closed climate screens create a pocket of air above the growing space that reduces indirect heat transfer.

Your greenhouse heating system has the same problem. It can make up for heat loss, but it works a lot harder to compensate for it.

Sealing those leaks helps your greenhouse retain more heat. Your heating system will use less energy to replace the heat and maintain target temperatures, which helps lower your heating bill.

Prospiant Greenhouses offers repairs, reglazing and preventative maintenance services to help you reduce

greenhouse heat loss. We also help you select materials and equipment for efficient heating and heat retention. **GT**

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