



How to keep your greenhouse warm during winter

By **Bill Keene**

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Much before autumn winds start turning chilly; you must start planning for winterizing your greenhouse. If you are going to need heating your greenhouse to any appreciable extent, now is the time to seriously put your head down and do the planning! This is also a great opportunity for an annual autumn cleaning and maintenance, so that you can tide over the winter with a clean, tidy, smoothly functioning greenhouse without any unpleasant mid-winter surprises such as breakdown of heating systems or temperature monitors!

What you can do and what you should do keep your greenhouse warm during winter is directly dependent on the temperature differential that exists between the external environment and the inside of the greenhouse. Greater the differential, more pronounced the expected heat loss from the greenhouse. So, it all boils down to two things – how to heat up the greenhouse and how to keep the heat inside.

Getting Started:

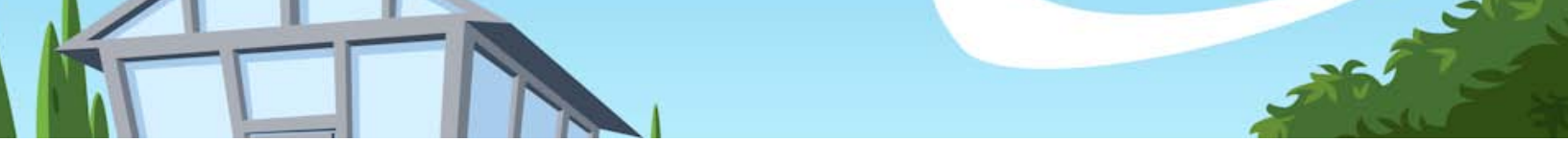
The first step is to maximize what you have. To allow best transmission of light from a weak winter sun, wash the glazing with mild detergent solution to remove accumulated grime, dust, leaves or summer shade coating if any. If you have double or triple polycarbonate glazing, be gentle while scrubbing, and clean along the direction of the channels. This will help prevent scratches. While you are at it, use the detergent solution on the frame and the benches as well. You would have to move your plants out of the way while you are on your cleaning mission!

Keeping the heat inside:

Before you get into a shopping mode, there is still plenty you can do to address the heat issue during winter.

Check all caulking for signs of wear and tear. If any sections need replacement, measure these and add the requirement to your shopping list. A lot of heat can escape from any cracks and crevices where sealing is improperly done. The meeting points of the frame with the glazing and the seam between the frame and the foundation are particularly vulnerable to heat loss due to improper sealing. Be sure to caulk these securely. The tiniest leak in your greenhouse will translate into additional heating costs.

An easy way to check for air drafts and leaks at seams is to hold up burning incense sticks at the points you suspect that either give off colored or white smoke. If there are any leaks, the smoke will pinpoint these for you!



This is the perfect time to replace any broken glass or polycarbonate glazing, and repair poly films if there are rents or tears anywhere.

You can use foam tape on doors and vents when winter has set in. These will further help in keeping the heat inside the greenhouse.

Bring out your greenhouse heater if you already have one and give it a thorough cleaning. Clean the blades, oil the motor, repair any damage that is noticed and replace any part that is not working smoothly. Test run your heater a few times to ensure that there are no glitches. Check that the thermostat is working accurately.

If you have a backup heating arrangement in the form of a portable propane or kerosene heater, give these a good cleaning and thorough servicing as well – just in case your main heater fails you at the wrong time! Remember to stock up on sufficient fuel for these to meet an emergency.

Now that you have done what you can to use and maximize your existing resources to keep the heat in, you can think about the wider aspects of heating the internal environment of the greenhouse.

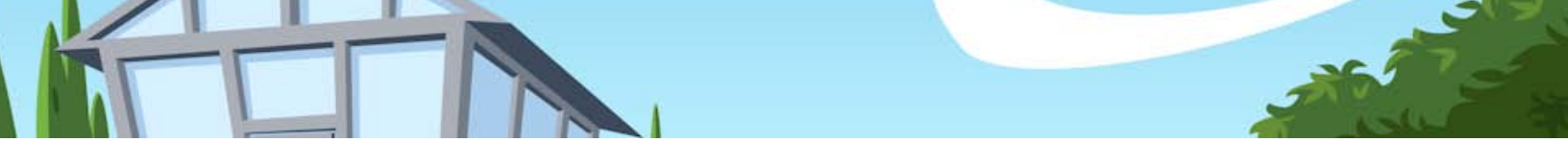
Heating options:

For glass greenhouses, bubble insulation can be installed inside the greenhouse. It works as a second layer of glass and cuts down the heating costs by up to 45%. An additional benefit is that, being translucent; it diffuses transmitted light evenly for all plants. Bubble insulation is convenient as it has a life of three to four years, is not difficult to handle, is relatively easy to put up and take down as needed, and does not take up much space to store. You can put it up using spray adhesive, hooks, and tape or find ways to wedge it in the frame. Adhesive spray is not to be used on acrylic or polycarbonate glazing.

If you have a single poly glazing and have been thinking of upgrading it, this is the time to take a call on it. Upgrade to a double or triple layers for best results. If you are not going to be able to do that, then make sure that you have other less expensive options open including addition of an inner vinyl or polyethylene layering.

Special reflective greenhouse insulation along the north wall and roof (in Northern hemisphere) or south wall and roof (in Southern hemisphere) works quite well in retaining heat and reflecting light. This material is basically foil backed bubble wrap commonly referred to as 'Reflectix' which is available in greenhouse stores, lumber yards or hardware stores. You can use this material first on the side that bears the brunt of the winter winds. Any wall that is not glazed needs to be fully insulated.

Another viable option is to use dense thermal mass as a sink for heat. It accumulates incoming solar heat and passively radiates the heat back to the greenhouse environment as temperature in the surroundings begins to drop. Thermal mass materials usually used for this purpose are water and rock. Many owners of solar greenhouses keep large black oil drums filled with water along the north wall to trap the sun's heat. You can also use the drums creatively as a support for plants or as a work table. A brick or stone wall on the north side, concrete or stone paving also work to absorb heat during the day and radiate it back at night.



If you are in a very cold area, you might want to consider putting up night curtains that is an insulating cover that has to be rolled across the glazing on the inside of the greenhouse at night to further curtail heat loss. However, this is a tiresome process and one which might not be as efficient as other more permanent options.

Allow light snow to stand on the roof of your greenhouse for the night as it acts as an insulating layer. However, clear the roof of snow if weight of the snow is of concern as far as the strength of your glazing material goes.


Insulating the foundation of the greenhouse is a necessity to keep the heat in. If the ground temperature is freezing outside, you need to make a barrier between the foundation of the greenhouse and the external environment. This can be done by insulating the outside perimeter of the foundation with styrofoam boards. Styrofoam boards of 1 to 2 inch thickness should be vertically placed to a minimum depth of one foot for effective insulation. In case the greenhouse does not have a foundation, place the boards in a trench around the perimeter of your greenhouse.

For an attached greenhouse, make sure you use only the access door through the house all through winter. Avoid using the door that is on the outside completely during winter as every time you enter or leave through this door, you would expose your plants to a blast of chilly air. The heat loss incurred by your entry or exit would translate into additional heating costs if you have heaters running. If your greenhouse is free standing and you have no choice, but to use the main greenhouse door for entry or exit, consider installing an extra door that creates an air lock entry. Keep enough space between the doors so that you can enter through the outer door, shut it, then open the inner door to enter the area where plants are. You would prevent the blast of cold air from damaging your plants in addition to limiting the sudden heat loss due to the temperature differential.

Another interesting idea is to use DIY solar greenhouse heating system. This might work for you if you are faced with clear, sunny but cold days frequently. The system works by heating up water in a drum by transferring the heat collected by the solar panels to the water. Shelving placed directly over the drum houses the most tender and temperature sensitive plants under a covering of transparent clear plastic.

You could also use heaters to heat your greenhouse. Gas heaters are environmentally friendly. Paraffin heaters may also be used, but both options would need proper ventilation of the greenhouse. Electric heaters are the most economical option for air heating. Electric heaters are affordable, portable, easy to use and can respond well to sudden temperature changes. You can install heaters of appropriate power depending on the size of your greenhouse. You might need to put in more than one heater to better distribute heat and avoid cold spots in your greenhouse. Avoid keeping any plants directly in the path of flowing hot air from the heater. When buying an electric heater for your greenhouse, ensure that you pick one that is specially designed for the purpose and has a built-in thermostat.

Heating mats and soil warming cables are only good for winterizing your plants if you are looking at using them in a very limited fashion. These are more useful when you start seeds or propagate plants



from cuttings for planting in early spring. Using these to warm your greenhouse in the dead of winter is not viable.

Heat mats are a possible choice to keep your tropical plants alive during winters. The heat mats are placed over an insulation layer, then covered over by plastic or glass. A thermostat monitors temperatures for plants in a container placed over the mat. You can use the heat mats on a limited selection of plants as the costs of electricity would become prohibitive on a larger scale. The mats can later be used for propagation of seeds and cuttings in preparation for the spring. Soil warming cables are also viable as a heating option in winter for a very small and limited area.

Though you may have taken all possible steps to ensure that your greenhouse is sufficiently heated during winter, it is a good idea to have several systems for checks and balances just in case things get tough with unprecedented weather or sudden failure of heating systems. Install a battery operated alarm that is set to go off if heating systems go off at night or if temperature dips below a set level. If you are dependent on electricity for heating your greenhouse, keep a couple of gas or paraffin heaters serviceable for emergency purposes. Drain all pipes if freezing becomes imminent and bring in your most delicate plants into the house if possible. Group the plants in clusters, surround these with high-backed chairs and drape them with blankets at night. Set your heating systems working as soon as possible to avoid permanent damage to your plants.