DIY Solar Window Heaters

Dear Jim: One chilly room in my house faces south, but has only one small window for the sun to shine in. Is there any inexpensive simple-to-build solar heater design I can put in the window for more free heat? - Sam W.

Dear Sam: Using the sun during the winter to assist your heat pump or furnace makes a lot of sense. Whole-house solar heating is not always economically feasible in all climates or for all house designs, but making a small one yourself for just one room almost always pays back its cost very quickly. Building one will be a good family project to get your children interested in conservation.

People usually associate the sun and solar energy with heating a home during winter, but it can also be used to cool your house during the summer by creating a natural breeze. Anytime you can use the sun's heat to create an air temperature difference between two spaces, it can be used to improve your comfort and cut your utility bills year-round. Also, cutting the peak electricity demand during hot summer afternoons is good for you and your utility company.

There are several design variations for simple do-it-yourself solar window heaters that will save energy year-round. I built a small one for the bedroom in my own home and it produces warm air output at about 120 degrees on a sunny day. During the summer, it functions as a nonelectric exhaust fan to create a natural breeze through my home.

I spent about $100 for the materials, but mine is fancy with aluminum trim on all the edges and with a double-pane top made of clear acrylic plastic. You should be able to build an efficient one for about $50 in materials or even less if you have some scrap lumber (plywood and wall studs) and an old storm door or window laying around the house. These designs do not use fans or electricity.

The concept of a solar window heater is simple. It is basically an insulated flat box with a clear top and a divider panel inside to create two shallow chambers, one above the other. The divider panel is shorter than the box so the two chambers are connected at the outdoor end. One end of the box is mounted in your window opening and sealed with weather stripping against the sash and the window frame. The other end slopes downward outdoors with a clear top facing the sun's rays.

The inside of the box is painted flat black to act as a solar good collector when the sun shines through the clear top into the divider panel to heat the air in the top chamber. As this air is heated by the sun, it expands and becomes less dense. This less dense heated air flows up the sloped solar heater and out into the attached room. This creates a natural draft to draw more air from the room into the bottom chamber.

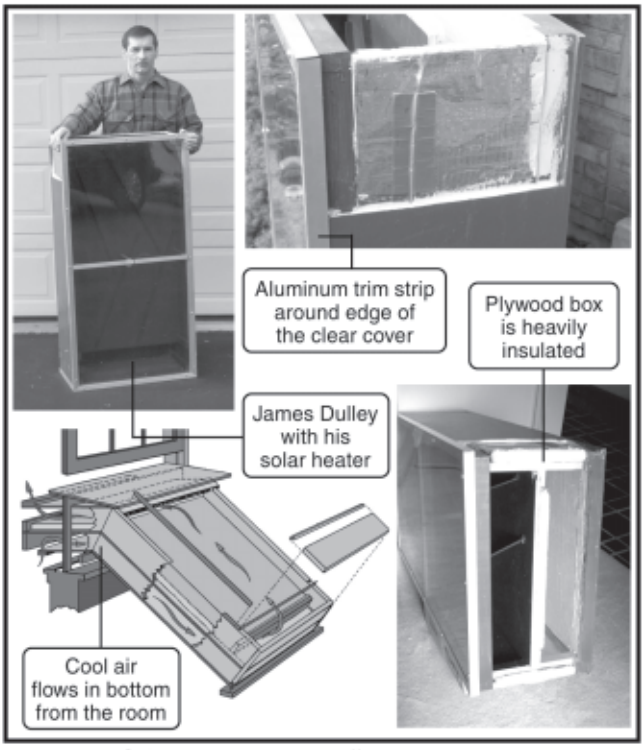
It helps to insulate the warm top chamber from the lower one to increase the temperature difference between them. A greater temperature difference increases the air flow (called thermosiphoning) of room air through the heater. It is also critical to insulate the outside walls of the box so the room air flowing down the lower chamber does not lose heat to the cold outdoor air.

The proper angle to slope the heater from your window depends upon your climate and the dimensions you make it. The further north you live, the steeper it should be because the winter sun is lower in the sky. Once you build it, try different angles to see which warms up your chilly room the most. A steeper slope may provide more air flow, but the output air may not be as hot.

Since I live in Cincinnati, which gets below zero some days, I built a clear top with two layers. I drilled several tiny weep holes in the lower edge to allow any condensation to escape. I also screwed "L"-shaped aluminum angle stock (from any hardware store) on the divider collector panel in the warm chamber. The angle pieces increase heat transfer and also create air turbulence. Aluminum is an excellent heat conductor so the air swirling around the pieces increases the heat flow from the hot collector to the air.

For free cooling ventilation, install a hinged door in the top of the heater immediately outside the window. During the summer, block the top chamber warm air opening from the heater to your room and open the outdoor hinged door. On a sunny day, the solar-heated air will exhaust out the hinged door and draw air from inside your room for a natural breeze indoors.

Write James Dulley, Rural Montana, 6906 Royalgreen Dr., Cincinnati, OH 45244 for (instantly download - www.dulley.com) Utility Bills Update No. 442 - do-it-yourself instructions, diagrams and materials list for making three designs of solar window heaters, some include an optional summer ventilation door. Please include $3.00 and a business-size SASE.



Solar window heater is effective year-round