



What is passive solar design?

Passive solar design is among the most cost-effective ways to improve the energy efficiency and comfort of your home – without a lot of fancy gadgetry. Passive solar design uses a combination of building features to increase heating and cooling efficiency while improving the feel of your home's indoor space. Best of all, these features require minimal maintenance, can bolster resale value, and are relatively easy to implement, especially in new construction. It's all about letting the sun shine in.

Solar geometry, site selection, and window technology determine a home's solar potential. Every building site can be optimized to receive the maximum amount of sunlight possible, but you have an advantage if you're on a south slope or on flat ground. Though we love trees, strategic trimming or cutting might be necessary to ensure that you're getting as much radiant heat as possible. Deciduous trees, such as birch, allow more sunlight to pass into your home during the winter than conifers. If possible, build away from structures that might block the sun's path.

Once you have a bright site selected, orient your home's widest section to within 30 degrees of south and along an east-west axis to give the sun as much face time as possible. When placing windows, always consider the angles at which the sun strikes your house. This will affect not only how you shape and locate your windows, but at what height.

Now that you're in the sun's good graces, it's time to consider the three ways you can harvest the sun's heat: when you're in its direct path (direct gain); when it radiates from objects that are heated by the sun (indirect gain); and when you selectively open up or close certain rooms based on their exposure to the sun (isolated gain). Placing the largest and greatest number of windows along the south side of your house will increase heat gain from all three sources.

Direct sunlight is great when it's available, but you can bank sunlight for later use by using special heat-absorbent flooring and walls that act as thermal masses. Long after the sun has set, these objects will continue to radiate heat into your home. Carpet may keep your feet more comfortable on a poorly insulated floor, but will inhibit solar heat absorption. To cut down on heating costs, use select rooms during the time of day when the sun shines the most and then close them off from your heated living area when not in use.

In the summer, when the sun shines nearly all the time, use carefully measured eaves to cut down on glare and help keep your house cool. The overhangs should be wide enough to block the higher-angle sunlight in summer, but allow the lower-angle sunlight through your windows in winter. Landscaping, such as shrubs, can also help manage your house's seasonal exposure to the sun.

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