

U.S. Department of Energy - Energy Efficiency and Renewable Energy Energy Savers

Passive Solar Home Design

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Your home's windows, walls, and floors can be designed to collect, store, and distribute solar energy in the form of heat in the winter and reject solar heat in the summer. This is called passive solar design or climatic design. Unlike [active solar heating systems](#), passive solar design doesn't involve the use of mechanical and electrical devices, such as pumps, fans, or electrical controls to move the solar heat.

Passive solar homes range from those heated almost entirely by the sun to those with south-facing windows that provide some fraction of the heating load. The difference between a passive solar home and a conventional home is design. The key is designing a passive solar home to best take advantage of your local climate. For more information, see [how a passive solar home design works](#).

You can apply passive solar design techniques most easily when designing a new home. However, existing buildings can be adapted or "retrofitted" to passively collect and store solar heat.

To design a *completely* passive solar home, you need to incorporate what are considered the **[five elements of passive solar design](#)**. Other design elements include:

- [Window location and glazing type](#)
- [Insulation and air sealing](#)
- Auxiliary [heating and cooling systems](#), if needed.

These design elements can be applied using one or more of the following passive solar design techniques:

- [Direct gain](#)
- [Indirect gain \(Trombe wall\)](#)
- [Isolated gain \(Sunspace\)](#).

When incorporating these design elements and techniques, you want to [design for summer comfort](#), not just for winter heating.

Your home's [landscaping](#) can also be incorporated into your passive solar design.

Learn More

Evaluation Tools

- [Solar Radiation Data Manual for Buildings](#)
Renewable Resource Data Center
- [SunAngle](#)
DOE Building Energy Software Tools Directory

Related Links

- [PATH Tech Set #6, The Sun in the 21st Century: Passive and Active Solar Systems](#)
Partnership for Advancing Housing Technology
- [Passive Solar Design](#)
A Sourcebook for Green and Sustainable Building

Reading List

- Crosbie, M.J., ed. (1997). *The Passive Solar Design and Construction Handbook*. New York: John Wiley & Sons, Inc.
- *Passive Solar Design* ([PDF 233 KB](#)). (December 2000). DOE/GO102000-0790. Work Performed by the NAHB Research Center, Southface Energy Institute, and Oak Ridge National Laboratory. Washington, D.C.: U.S. Department of Energy.
- Kachadorian, J. (1997). *The Passive Solar House*. White River Jct., VT: Chelsea Green Publishing Co.
- Van Dresser, P. (1996). *Passive Solar House Basics*. Santa Fe, NM: Ancient City Press.