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Solar Heating and Cooling

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Passive solar design refers to the use of the sun's energy for the heating and cooling of living spaces. In this approach, the building itself or some element of it takes advantage of natural energy characteristics in materials and air created by exposure to the sun.

Using passive solar design techniques to heat and cool your home can be both environmentally friendly and cost effective. Passive solar heating techniques once applied to a project are usually design related and are incorporated into the construction as a one-time cost. Most passive solar concepts are not mechanically based so they do not wear out and need to be replaced. Things such as;

- Orientation of the home to the sun
- Landscaping to block summer sun
- Adding overhangs to block summer sun
- Glazing your windows properly to absorb sun where desired
- Adding thermal mass behind those windows that collect sun
- Including venting in rooms that act like collectors so that heat is transferred to other parts of the house that do not get solar gain

Adding these types of design features to your home or new construction design can provide you **FREE** energy or limit your use of energy over the life of your home.

Passive solar while a tremendous attribute to a home can also be a significant problem when it comes to cooling a home that is filled with sun. In existing homes this is the first consideration for the Energy House team when they are doing an Energy Review. Steps can be taken in an existing home to maximize or minimize passive solar gain. In new homes consider an architect that has experience in designing passive solar applications to the overall design of the house. These designs and considerations do not have to be radical to have a long term effect on the energy that you use.

Solar Tips and Thoughts

Keep all south-facing glass clean.

Make sure that objects do not block the sunlight shining on concrete slab floors or heat-absorbing walls.

Passive solar designs are simple. This simplicity means greater reliability, lower costs, and longer system lifetimes.

Since passive systems have few if any moving parts, they perform effortlessly and quietly without mechanical or electrical assistance. Simplicity lowers the cost of the job. Without motorized dampers, automatic valves, sophisticated control systems, or high-tech components, much of the work can be done using standard building materials and basic construction skills.

The most significant reason that passive makes sense economically is that most passive designs are inherently durable, lasting at least as long as the rest of the house with little or no maintenance or repair.

Conventional building materials such as glass, concrete, and brick weather well and are generally long-lasting.

For the life of the house, a passive system should continually maintain, if not improve, its value at least as well as the rest of the house.

It should require little more maintenance than a standard wall or roof.

Because you can build passive designs in small sizes, the initial effort need not involve a large financial commitment. Instead, the first step can be relatively small with correspondingly little risk.

For optimum performance, some passive systems require daily or monthly adjustments of shades, shutters, or vents. Although some people may at first regard this as an imposition, it is really no more trouble than operating a dishwasher or closing draperies in the evening. Before long, passive-home residents will find these to be pleasant routines that bring them closer to the flux of the environment to which their homes are attuned. They are usually rewarded with a rich and exciting living experience as a result of their efforts, while saving both energy and money.

Radiant heat from large passive collecting surfaces is usually more comfortable than the drafty heat of conventional hot air or hot water heating. In well-designed systems, temperature variations are small, generally within a range of 5° to 10° each day. But in less well designed houses, temperatures can vary more widely. Some solar enthusiasts feel such temperature fluctuations are natural, and not uncomfortable, particularly at the higher end. In fact, many passive home residents enjoy the warmer-than-usual temperatures on a sunny winter day. Passive solar systems save fossil fuels. The economy is benefitted because the nation imports less oil. And since passive energy systems do not require transmission lines, pipe lines, or strip mines, they produce neither dangerous radioactive wastes nor polluted air and water.

Passive systems have few negative consequences. They can use renewable and recyclable materials, and they produce jobs