

Selecting a Site for Your Passive Solar Home

A good passive solar house requires more than just a good design and quality construction. It also requires that the plan and the site be considered together during the design phase to assure that they work together to optimize solar performance. The best-designed solar house plan will not work unless it is placed properly on a building site which allows solar access. Similarly, a lot with clear solar access provides little advantage to the building placed upon it unless the building is designed and oriented to take advantage of the site's solar potential.

Some people decide first upon the house plan they want and then search for a lot which accommodates it; others start with a lot with solar potential and then look for a plan which would use it to advantage. The order here does not really matter. The important thing is to realize that good solar house plans or good solar lots do not exist as separate entities; they meet their potential only when the plan and lot are properly integrated to create the successful solar house.

What is a Passive Solar House?

A passive solar house is one which is designed and oriented to take maximum advantage of the sun. Since the sun's path in the northern hemisphere passes through the southern sky, passive solar homes are designed to maximize southern exposure.

The house can be of any shape, but it is usually laid out so that the major living areas of the house are either located on the south side or have direct access to a room which is. For a rectangular house, maximizing solar access can be achieved by orienting the house so that its long axis runs from east to west.

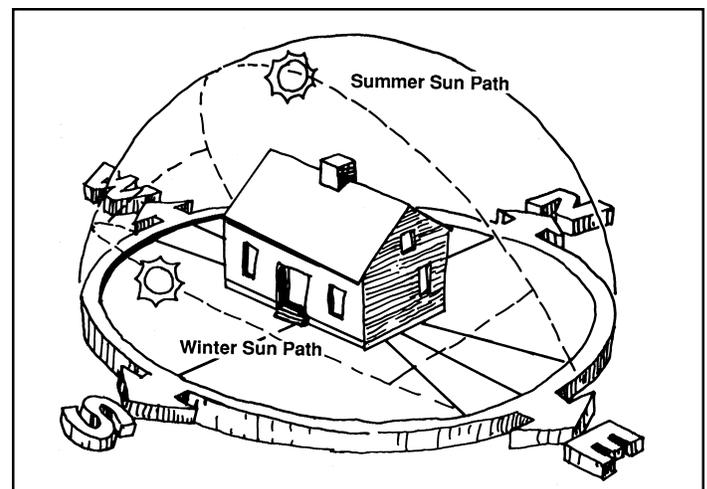
The majority of the solar house's windows are located on the south side so that they can receive the maximum amount of heat from the sun in winter when it is low in the southern sky. In the summer, when the sun follows a longer and higher path, overhangs located over south-facing windows and walls will help shade these areas from direct sunlight to reduce overheating. Overhangs

located on the east and west do not shade effectively because the sun is much lower in the sky when it shines from the east or west.

As far as solar performance is concerned, it makes no difference whether the solar portion of the house is the front, the back, or the side; what matters is that the house must be placed on the lot so that the solar portion can be faced as close as possible to true south with a minimal amount of shading in the solar access zone. To avoid overheating in summer, the solar portion's orientation should not deviate by more than 15° from true south. A southeastern deviation is less harmful than a southwestern deviation.

What is the Solar Access Zone?

Facing solar surfaces to the south is not enough to ensure their performance; you must also make sure that the area to the south is clear of obstructions which would block the sun from reaching them. There should be no significant blockage between 9 AM and 3 PM, solar time, in the winter. At North Carolina's latitudes, this means that the area extending from 45° east of south to 45° west of south should be kept clear of obstructions which would block the sun.



How far back does this solar access zone extend? Obstructions directly to the south of the building need to be located at a distance of at least 1.7 times their height away from the surface to avoid shading the building in winter. Obstructions located along the 45° lines east or west of south need to be at least 3.5 times their height away from the building to avoid shading. Remember that the sun is lower in the sky and casts longer shadows in winter, so don't automatically assume that just because your site appears to be out of the shade in summer that it will also be unshaded in winter.

What Makes a Good Solar Site?

A good solar site is one that will allow placement of the house so that its solar surfaces face true south with a minimal amount of shading in the solar access zone. It is helpful to have control over as much area as possible in the solar access zone since tall trees or multi-story buildings added later to the south of your house have the potential to reduce its solar performance by shading.

Lots which are deep from north to south offer the homeowner more control over the solar access zone, as does siting the house toward the north end of the lot. For lots located on the north side of the street (suitable for houses with solar "fronts"), the street can act as part of the buffer against development in the solar access zone. Locating the houses' septic drainage field within the solar access zone (assuming soil type and slope are suitable there) is another strategy for maintaining solar access, since that area will need to be cleared of vegetation.

What about Easements and Covenants?

Developers may include easements or covenants with the deeds of lots which can affect the ability of those lots

to be used for solar houses in either a positive or a negative way. If lots are deeded with a solar easement, it removes from the homeowner the burden of negotiating an easement with neighbors and protects the investment in a solar home. On the other hand, the development may include restrictive covenants that would preclude placing solar collectors or photovoltaic arrays on the roof, or might restrict the homeowner from removing trees within the solar access zone. The developer might also retain the right of way for an integrated landscaping plan, such as planting a row of trees lining the street (which would block solar access on the lots north of the street). Be sure to ask about zoning laws and covenants attached to a deed before purchasing a lot for your solar home.

Tips for Solar Lot Hunting

Look for roads that run from east to west. Since standard subdivision practice calls for lot lines perpendicular to the street and houses fronting parallel to the street, this is the easiest way to find lots suitable for siting houses with the long axis running from east to west.

If your plan has a solar front, look at lots on the north side of the street; if it has a solar back, look on the south side.

Look for lots that are deep from north to south to allow a maximum amount of control over the solar access zone.

Look for flat or south-sloping lots which allow maximum solar access. Avoid north-sloping areas, since they cast longer shadows and make obtaining solar access more difficult.

Find out about zoning regulations and restrictive covenants in the development.

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