

EXTREME OFF-GRID TINY HOMES

SIMPLE | AFFORDABLE | ENERGY EFFICIENT

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EXTREME TINY HOMES USE PASSIVE SOLAR DESIGN

I love Tiny Houses. I love the ideas of frugality and simplicity that they represent. The popularity of Tinys is driven by the beauty of their design. I can create a purely functional, very small dwelling that is, at its best, boring, and at its worst, ugly. The problem that I see with many Tiny Houses is that many are very beautiful spaces that I would never want to live in because they will be very hot when the sun shines and very cold when doesn't. Beauty without comfort is not acceptable. I want to create a space that is comfortable for human beings every day and in every kind of weather. I'm an old man who has been designing and building small dwellings since my youth. One thing that I have learned to utilize that makes a home I want to live in is Passive Solar design.

I could design, as many do, Tiny Homes whose most obvious feature is glass, glass, and more glass. A structure with too much glass overheats when the sunshines and becomes too cool when darkness falls. The resulting temperature swings are felt as drafts. The human body is very sensitive to temperature changes. So what do designers do? They throw expensive energy at the box full of windows. The cost of making bad design comfortable lasts forever, and bad design with artificial heating and cooling is seldom as comfortable as a well designed space. Please consider this: if one of the reasons to own a Tiny House is to be a good steward of resources, then Passive Solar design must be considered.

The first question that I had to answer was this: Would Passive Solar design principles actually work in very small spaces? The only way I knew to answer that question was to build a Tiny using Passive Solar and live in it. Living in a space is the best way to test any design feature. Passive Solar design works well in a small space, with one modification, enhanced ventilation.

The good news is that Passive Solar is simpler and more cost effective than heaters and air conditioners. The basics of Passive Solar are as simple as 1, 2, 3:

- 1) The ratio of glass to the square footage of the living space should be between 17 to 22 percent: seventeen percent for moderate climates and up to twenty-two percent for colder climates. Most of the glass should be on the south side of the home.
- 2) The space must be well insulated. In the case of a Tiny House, this means a complete envelope, including the floor.
- 3) Mass must be included in the living space to moderate temperature swings: two to four gallons of water per square foot of glass, or two cubic feet of solid mass, like concrete, stone or brick, per each square foot of glass. A combination of water and solid mass can be used. Mass heats and cools slowly. It is the key to comfort. It is also very heavy. If you move your home regularly, weight becomes a problem. In a mobile Tiny, water is a good choice for mass. Containers can simply be drained for travel. I also use wood stoves, surrounded by rock or concrete, to increase mass. The rock or concrete dramatically improve the efficiency of the wood stove.

In a small space ventilation must be increased for comfort. I created floor vents to the outside with efficient fans to increase air flow. If you are using solar electricity, the efficiency of the fans is critical. The vents can be closed during extremely cold weather.

During the summer the coolest air available is in the shade under the house. Drawing this cool air into the structure is often enough to provide comfort. The windows must be shaded from the sun to avoid overheating. In very hot and humid climates, air conditioning may be required.

If you want a cost effective, comfortable Tiny House, consider the advantages of Passive Solar design. We are happy to provide free plans and free consultation