

SOLAR ENERGY

Heating

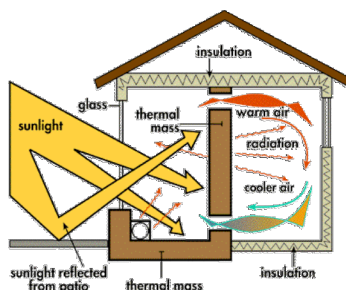
By: orienting your home facing south, toward the sun, solar energy can warm your home. When the shutters of the home are closed, heat is trapped and your home remains warm throughout the night. There are three techniques used to collect heat. They are as follows:

1. **Direct Gain**, or the construction of glass on the south wall allows the sunlight to be absorbed into the floors and walls. This is a great insulation method, but the rooms that admit light could be uncomfortably bright.
2. **Greenhouses or sunrooms** are rooms dedicated to the storage of heat. Perfect for the propagation of plants.
3. **Tombe wall**, or **water wall** that is sheeted on the south with thermopane glass. The sun passes through the glass and falls directly upon the storage wall. This heat is then admitted to the house by conduction, when heat radiates through the wall into the house, or convection, when a vent is placed at the top and bottom of the mass wall.

Cooling

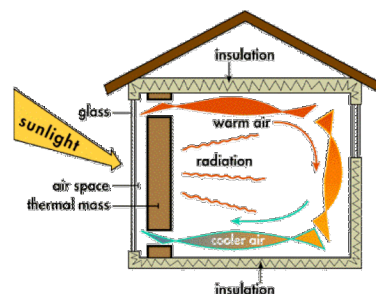
During the summer, one may notice a change in the angle of the sun. With careful design of overhangs on the south side of the solar home, the sun may be excluded at any predetermined date. When the sun is blocked, thermal gain works opposite of how it works in the winter. The house gives off heat at night, when it is cool, and absorbs heat in the day, thus keeping the interior cool.

The figures below give a general idea of the flow of cold and warm air in passive solar design.



Direct Solar Gain

Source: www.communityenergycenter.org



Indirect Solar Gain

Source: www.communityenergycenter.org

Buying Green Energy - The encouragement of wind generated electricity and it's development available in detail at Kit Carson Electric for Taos County residences.

CONSTRUCTION USED IN TAOS AREA



Adobe – Adobe bricks are made with dirt that has been moistened with water, sometimes with chopped straw added for strength, and then allowed to dry in the desired shape. The adobe blocks are then stacked like bricks to form internal and external walls.

~~~~



**Earthship** – The basic Earthship design incorporates passive solar architecture. The primary retaining walls are constructed with used tires, filled with earth and stacked up like bricks. The interior surface of the tires is then plastered with adobe or cement so the tires don't normally show. Another type of wall can also be constructed through the use of empty aluminum cans mortared into lightweight, curable walls. Earthships often employ many ecological concepts, such as water catchment from the roof, reuse of rainwater, composting toilets, indoor gardening, etc.

**ICF's (insulated concrete forms)** – Insulating concrete forms (ICF's) are hollow foam blocks which are stacked into the shape of the exterior walls of a building, reinforced with steel rebar, and then filled with concrete. ICFs combine one of the finest insulating materials, Expanded Polystyrene (EPS), with one of the strongest structural building materials, steel reinforced concrete. The result is a wall system of unmatched comfort, energy efficiency, strength, and noise reduction.

**Light clay** – Clay is an excellent building material. It's affordable and recyclable, an excellent heat absorber, and regulates indoor temperature variations. Mixed with fibers, it provides insulation. The clay preserves and protects the fibers from insects, mice, fire, and absorbs odors, while lending itself to architectural creativity and flexibility.

**Post-and-beam** – A basic building method that uses just a few hefty posts and beams to support an entire structure.

**Pressed earth block** – It is really quite similar to adobe technique, in that the soil is mostly clay and sand. The difference is that the material is compressed or tamped into place, usually with forms that create very flat vertical surfaces. Modern rammed earth typically utilizes heavy mechanized equipment to move and compress the material. The walls are normally at least a foot thick to give enough bulk to be stable and provide the thermal mass for comfort.

~~~~~



Pumice-Crete – Pumice-crete is a low-density concrete made from pumice aggregate, Portland cement, and water. It is a mix that succeeds in providing structural strength and insulation in one material. Typically it is poured on site in wall thickness of 14” or greater and no additional insulation or structural components are necessary. Wall surfaces are finished by applying plaster coats on the interior and exterior, which further aid the thermal performance by trapping air within the honeycomb pumice-crete mix. The walls are very durable, fireproof, have good noise resistance, and are very aesthetically pleasing because they can be formed to fit many architectural appearances and styles. www.pumicecrete.com

~~~~~



**Rastra Block** – Rastra is a concrete form system made of a lightweight material 85% of which is recycled material mixed with concrete. The blocks are stacked like Lego’s and then the cavity left inside the wall is filled with concrete and reinforcing with metal bars. (Rebar). The result is a concrete wall with foam insulation on both sides, thus combining insulation with thermal mass. The recycled insulation offers the ultimate in properties for a wall, such insulation, soundproofing, fire protection, and is resistant against frost and heat radiation. It does not entertain mold or attract nesting insects.

**SIP (structural insulated panels)** – SIP’s are high-performance building panels for floors, walls and roofs in residential and commercial buildings. Each panel is typically made using expanded polystyrene (EPS), rigid foam insulation sandwiched between two structural skins of oriented strand boards, but other surfaces are also available to meet your needs. The result is a building system that is very strong, predictable, energy efficient, and cost effective.

~~~~~



Strawbale – A Strawbale house is just that: a house whose walls are composed of straw bales. Bales are placed either in a framework of posts and beams or they are “load bearing” and thus bear the weight of the roof. Straw bale houses offer excellent insulation. At R 2.7 per inch an eighteen-inch wide bale equals R-48! Some frame house (to give you a point of comparison) may have walls of R-19. Straw bale houses are non-toxic and very breathable. Some people raise concerns about mold and pests. Such concerns are unnecessary when the house is well constructed. www.strawbale.com

MORE INFORMATION:

www.sustaintaos.org

www.kitcarson.com

www.solarplans.com

www.valverdeenergy.com