

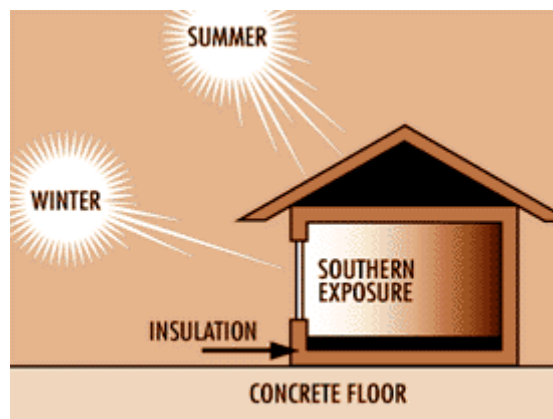
Scott Loughran
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Passive Solar Heating

It has been said that the need to save our worlds energy resources is greater now then it ever has before. This is due to the fact that consumable energies have become the fuel for so many of our everyday necessities; cars, toasters, flashlights, television and the retractable roof at Safeco Field all consume some type of fuel. Since these resources are dwindling any new, efficient and producible form of energy needs to be explored. One form of energy that is certainly not new but commonly not associated with energy today is passive solar heating. Passive solar is the heat given by the sun that can be collected or rejected by other materials. A very common and important object when it comes to passive solar is our homes and the materials they are made of, but there are other ways passive solar can be used to effectively to cut back the use of mainstream energy. Passive solar heating will not exterminate the need for traditional forms of energy, but plays a significant role in the reduction and preservation of consumable energy.

Our homes are great examples of how we use passive solar heating in everyday life, not matter the time of day or the time of year. If an ordinary household tracked their utility costs year after year they would see a common trend, heating bill goes up in the winter and down in the summer. The colder temperatures will always demand a need for more heat but instead of spending consumable energy on pumping heat out of our furnace, what if we had a practically unlimited amount of heat that wouldn't carry an hourly or daily rate? The sun is the source of passive solar heating just as it is the source of energy for solar electricity generated by solar panels. These two forms of energy are

not the same because solar electricity requires tools to create the energy where anything can be heated through passive solar with out any tools of gizmos.

When sunlight strikes something and it begins to collect thermal energy, it is a product of passive solar heating. Our homes utilize passive solar heating through products such as windows, walls, floors, roofs, exterior material and landscaping. The design elements of the house along with the material these products are made out of can make a home extremely energy efficient, causing it to use less gas and electricity to function. A lot can be done simply in the design elements of the house to gain energy efficiency. The most important of these is the layout of the home and designing the main living spaces to be on the side of the home that faces south. The daily route of the sun spends the most time shining north, causing south faced structures to collect the largest amount of passive solar heat. The second most important facet of passive solar home design is the positioning of your eaves that hang from your roof. The amount of overhang creates an optimum situation that utilizes sunlight in the winter and shades your windows from direct light in the summer as pictured below:



Windows, walls, appliances, floors, roofs, exterior material and landscaping all can aid in reduction of energy used in our homes through technological advances and the

invention of new materials to construct these products from. A list of these products along with technical information on them can be found on the Department of Energy website. According to DOE's website they estimate that with all available products and concepts integrated into the construction of homes energy consumers use 30-70% less energy in comparison to the traditional home and can save up to 50% on there energy bill. This unconsumed energy can be rerouted or saved for use in other modes such as electric cars or the money saved could help you afford that Hummer you've been wanting.

Mother Nature loves to cook just as much as Aunt Jamima since she has given us passive solar for cooking in what is called a solar oven. The benefit of solar ovens are that they can be used anywhere the sun shines regardless of the air temperature and can cook up to temperatures of 360-400. Direct and reflected sunlight goes into the oven through glass doors, trapping the heat and converting it into energy. Following the concept of 'heat lost is heat gained' the sun's heat causes the ovens internal temperature to rise until the heat lost by the oven is equal to the solar heat gain. The black interior of the oven absorbs the light converting it into heat energy and changes the wavelength of the energy so it can't pass back through the glass door and escape. This conversion of energy makes the oven even more efficient along with repositioning the oven every 30 minutes to follow the sun's path. Cakes, cookies, hot wings, chicken nuggets, steaks and crème brulee can all be baked inside a solar oven at almost the same consistency as a conventional oven.



Even though passive solar heating is not a widely known source of energy we all use it in our homes and cold blooded animals use it to heat their bodies. The misunderstanding of, or lack of knowledge on the subject of passive solar energy causes us to not utilize this endless source of energy. The design elements that surround passive solar energy in the heating, cooling and supply of light to our homes has been implemented in the Peace Corp. education of third-world citizens who do not have the availability to or the finances necessary to get electric and gas utilities. Historically in the United States the understanding of using the sun as an energy source can be seen in the building of pueblos and cliff side cities by Native Americans. Even though these native designs date back hundreds of years into the southwestern tribes of America and into Central and South America, passive solar energy could be utilized in coldest of climates despite historical evidence that leads us to civilizations closer to the Equator.

Factories that utilize and suck up so much of our worlds consumable energy could not run much of it's equipment without those sources but they could cut back in how much it uses through passive solar heating, cooling and daylighting concepts. These implementations would also create better work environments that allow humans to be healthier and happier at work. Transportation needs also will not be suitable for passive

solar energy, but the reduction in consumable fuel use passive solar energy could bring to the world, could lead to slowing down or stopping the energy crisis of over-consumption of traditional energy.

The major obstacles that stand in the way of passive solar use is a lack of education of its efficiency and cost savings. Political and geographic obstacles don't really exist but a thought of the economic restraints might keep someone from looking into a passive solar designed home. The recommendations made by the DOE to implement into your homes design are ones that will cause no significant increase into the current cost of home production and actually will produce less waste then construction now causes. Since there is sunlight light even on a cloudy day passive solar energy can be generated almost anywhere in the world year round. Many products have already advanced the use of passive solar energy but with the understanding in how much it can reduce the use of other energy forms will only create further advancements.

In retrospect the only major drawback of passive solar energy is that in can not replace the need for consumable fuels such as gasoline, electricity and natural gas. The use of the sun to create the consumable fuel of electricity is through the technology of solar energy through solar panels as earlier explained. Since passive solar can not convert into any form of energy other then heat, its ability to supply the types of energy that our society has become dependent upon is unseen. Through the application of passive solar energy into our home energy needs, a significant reduction of other energy sources used in our homes could easily be seen.