SE Construction, LLC
Sustainable Environments

Passive Design in the Desert 101

Key elements of passive design include the following:

- **Heavy insulation:** The most important component of a passive house is a layer of highly efficient insulation that wraps continuously around the building envelope. This can be in the form of Foam, Cellulose, or Batt Insulation
- **Design without thermal bridges:** The heated air inside a house will follow the path of least resistance to the outside of the house, known as a "thermal bridge." Conventional homes offer plenty of them, in the form of inefficient windows, poorly insulated walls or cracks under doors, but passive house design eliminates them through superior insulation and efficient windows and doors.
- **Airtight construction:** Passive houses feature airtight construction to prevent moist room air (or humid outside air, in warmer climates) from penetrating into the home's construction where it can cause mold, affect inside air quality and even structural damage. There are several ways to achieve this air tight construction. All connections can be caulked. Or a product such as AeroBarrier can be used.

- **Ventilation:** Another important component of passive house design is its efficient central ventilation system, which continually exchanges moist, "polluted" inside air for fresh, filtered outside air to maintain a comfortable, consistent temperature and humidity level. In hot climates and ERV would be used.

- **Passive heating/cooling technology:** Perhaps the most ingenious part of the passive house concept is its ability to heat (or cool) the inside spaces with nothing but fresh exterior air. As fresh, cold air enters the house through the ventilation system, it is heated by the warm air it passes on its way out. Using an air-cooled chiller system or geothermal underground system combined with the other forms of passive design can keep your home at a comfortable temperature in the hot desert summers.

- **High-efficiency windows:** Efficient windows are essential to the passive house design. The specific windows used vary from climate to climate, but triple-paned windows with low-e glazing, argon gas and insulated frames are common.

- **Passive solar gains:** Passive solar gain -- that is, the good old warmth of the sun -- is the primary source of heat for a passive house, so the situation of the home on the lot and the size and position of windows are important factors.

- **Shade:** In the heat of the summer sun, shade is your best friend. Placing trees, shrubbery, canopies, etc on the hot side of the home reduces the heat gain from the sun, thereby creating a more comfortable climate inside the home.