Lee Residence
Phoenix Arizona

Year Constructed: December 2004
Architect: Dennis G. Lee Architect 602-620-3527
2500 SF Livable

Passive Solar and Sustainable (Green) information:

Siting of House: North - South orientation for optimum solar control. Dual pane low E windows facing south to capture winter sun for heating. All heating was completed with free energy. The backup heat pump was not necessary in the winter. The correct design of the roof overhang is critical in Phoenix as you do not want to over heat the house. Some horizontal "fin" walls are used to control glare and unwanted heat gain in the summer. There are no west facing windows. Building orientation is free and where you must begin in designing a passive solar home.

Thermal mass storage: Stained concrete floors and an interior masonry wall were used to store heat and release heat at night.

Natural Ventilation: Sliding doors and operable windows are positioned for cross ventilation to capture the natural breezes to help cool the house during those "transition" months when it is still warm during the day.

Day lighting: All rooms have some form of natural day lighting to reduce the need for artificial lighting. All windows have been carefully placed to balance solar gain, views and day lighting.

Future Photo Voltaic: Designed home with low energy consumption to start with. This way system can be smaller and more cost effective to begin with. Designed home with energy efficient appliances, lighting, HVAC & proper roof and wall insulation.

Solar Water Heating System: The system is a roof mounted passive system with no pumps to maintain. Manufactured locally by Sun Systems. 75% of water heated by solar.

Wall system: Form (ICF) – manufactured by Reward Wall
The wall is an 11" polystyrene foam block with a 6" concrete core. The "equivalent" R value claims to be R-50. Virtually little heat gain or loss or infiltration occurs through this wall system. House stays comfortable throughout. Hot and cold areas found in typical homes are eliminated. Sound and Fireproof qualities are also a benefit.

Water Use: Low flow toilets and plumbing fixtures. Desert Landscaping with a drip irrigation.

Air Quality: This is a tightly sealed house and therefore indoor air pollution is a concern as in all buildings. A fresh air ventilation system is provided and tied to the house's return air ducts. A separate control system provides options for natural ventilation or recirculation. Low VOC paint and cabinet stain used on Interior. Carpeting minimized to reduce dust collection.

HVAC: The system is a readily available high efficient heat pump with a two-stage compressor with a seer rating of around 19. Programmable thermostats with a three-zone system provide optimum control. Compressor runs automatically on low to save energy. Because of the houses insulation , a smaller mechanical system was achieved. Only one 4-ton unit was needed.

Roof Insulation: R-35 blown fiberglass in ceiling and 2" foam roof of R-10.

Other Green features: Interior walls constructed with metal studs for its recycle content. Front Door is a MDF material that is a by-product from cutting lumber. Low voltage and florescent lighting provided. Stained concrete floors.