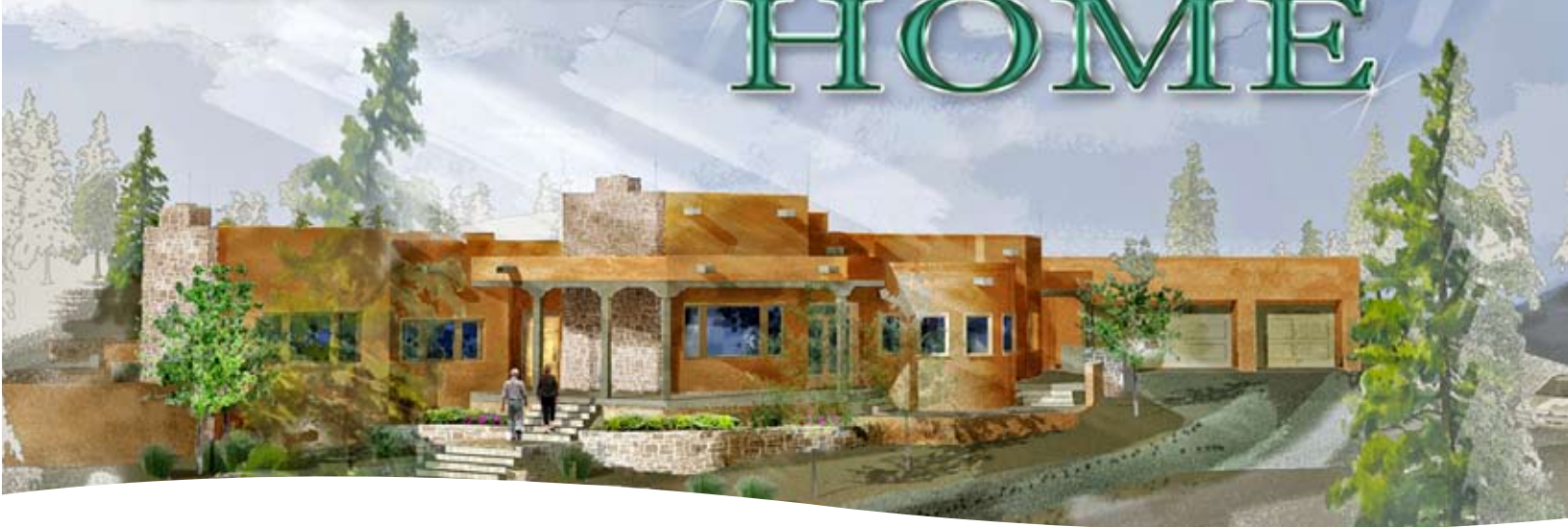


The EMERALD HOME



“The Net-Zero Energy Jewel of the Southwest”

The Emerald Home has achieved a true net-zero energy capability and the highest certification in all categories of Santa Fe’s new Green Building Codes. The Emerald Home combines old world craftsmanship, unique materials and the finest finishes to insure durability and lasting beauty. Incomparable attention to detail highlights Designer/Builder, Faren Dancer’s commitment to quality and true sustainability.

Listed within are many of the aspects that propel the Emerald Home to the pinnacle of sustainable building practices and to the very leading edge of custom home design innovation.

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Energy Efficiency



Additional Solar PV roof mounted modules for a total 9.2 kw system. Total output will exceed 20,000 kw hours.



Geo-thermal mechanical room with ground source heat pump connects to six 200 ft. wells drilled beneath the driveway.



OaSys hybrid Air Conditioning uses dual stage evaporative technology producing 40 SEER of cooling for a mere 580 watts of electricity.



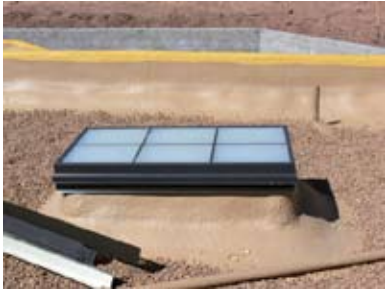
Solar Photovoltaic 1.8 kw tracker.

In obtaining a net-zero designation, and a corresponding Home Energy Rating System (H.E.R.S.) Index of -5 (minus), it isn't simply a matter of adding renewable energy or even energy efficient systems for heating and cooling. It all starts with the building envelope. The Emerald Home attained a H.E.R.S. 35 before adding renewable energy. The calculated heat load for the home, based on building performance modeling, estimated the home to have a 35,000 BTU heat load. A typical size home, based on conventional building practices would require 135,000 BTU heat load.

- A large capacity Photovoltaic Solar System including a PV Tracker that follows the Sun's trajectory throughout the day. This grid-tied system will produce enough surplus electricity to turn the meter backwards, averaged over the course of the year the home will generate a net-zero energy usage.
- A Geo Thermal (ground source) radiant floor system that utilizes six 200 ft. deep wells to tap the Earth's temperature for maximum energy efficiency.
- Solar Thermal Domestic Hot Water supplements the radiant floor system when excess hot water is produced.
- The OaSys dual stage hybrid cooling system provides 40 SEER of cooling for 580 watts of electricity. It also interacts with interior thermal mass and provides needed summer moisture. The back-flush water is directed into the cisterns and used for irrigation.
- Additional energy usage during the winter can be offset by clean burning, sealed combustion European freestanding fireplaces utilizing ceramics for radiant heating.
- Energy Star rated appliance and lighting packages include over 80% LED or CFL lighting fixtures. CFLs (Compact Florescent Lighting) uses about 33% the energy of typical incandescent fixtures. LEDs consume around 6% the electricity of that same, typical lighting. A 1.5 watt LED bulb produces the equivalent light of a 25 watt conventional bulb.

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Building Envelope



Skylights with 4" of Nanogel provide a true R-20 Insulation value.



Garage walls, bermed into the slope, are constructed from Insulated Concrete Forms (ICFs) with waterproofing material applied.



12" thick double framed walls allow for continuous insulation.



Double framed exterior walls are packed with blown-in cellulose for a true R-42 with no Thermal Bridging.

- The Emerald Home has the highest performing windows and exterior doors on the market (R-7), including heat mirror glass, Krypton gas and insulated frames. The entry door is 4" thick reclaimed ash with heat mirror glass.
- A unique double frame exterior wall system with 12" of blown-in Cellulose (recycled newspaper) provides a true R-42 insulation value. Because there is continuous insulation between the two wall frames, there is no Thermal Bridging (heat/cold transfer through the studs). A common occurrence in framed walls is when air can move from one plane to another, technically known as Thermal Bypass. All framing details are addressed for thermal bypass by tightly sealing all potential points of air transfer as well as penetrations.
- Super high-efficiency skylights with Nanogel technology producing an R-20 insulation rating. (typical double dome, plastic skylights are an R-1.5)
- Six Solatubes are also utilized for Natural Day lighting in hallways, closets and the pantry. Providing large quantities of light with minimum roof penetration and roof turrets encased in polyurethane foam, equals real energy performance at a modest cost.
- The open beam roof areas average 8 inches of polyurethane foam for an R-52, the remainder of the house has 12" of blown in cellulose between the trusses and an additional 4" average of polyurethane foam above for an average R-68. Beyond R-Value, the foam acts to seal all roof penetrations and aids in the mission of eliminating Thermal Bypass.
- Under the concrete slab is 2" of high-density, rigid foam (blue board) with 4" of sand on top. All seams and plumbing penetrations are taped and sealed. The stem-walls are constructed with Insulated Concrete Forms (ICFs) supplying 2-1/2" of foam on either side of 8" of the concrete center.

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Hard non-outgassing surfaces replace wall to wall carpet that also traps dirt and dust mites. These surfaces also provide additional thermal mass.



Cabinetry contains no formaldehyde, plaster is very green with organic wax finish, no VOCs (Volatile Organic Compounds) in paints, wood or floor finishes.



Flat pipe under slab connects to five interior wall vents through the roof, keeping radon out of the living space.



Energy Recovery Ventilators (ERVs) provide fresh air exchange necessary with a high-performance building envelope. Hepa filtration also takes out pollens, allergens and particulates.

Indoor Air Quality

- State-of-the-art Energy Recovery Ventilators (ERV's) provide the necessary filtered air exchange for a home with a superior building envelope. The added HEPA filtration removes allergens, pollens and particulates.
- Avoidance of wall to wall carpeting in the home eliminates typical outgassing and the trapping of dirt and dust mites.
- Radon mitigation is a prerequisite for LEED Certification. New Mexico, being in Zone 3, is considered a risk, but it greatly varies depending on location. An under-slab radon mitigation venting system is provided with five interior wall vents through the roof.
- Indoor air quality is enhanced by using formaldehyde free cabinetry and the lowest possible VOCs (volatile organic compounds) in all paints and finishes. All caulks, sealants and adhesives are the greenest available.
- The hybrid evaporative coolers filter incoming summer air and because of the dual stage technology (air is pre-cooled before travelling through the wet pads) the interior humidity typically will not exceed 60%. Old-tech evaporative coolers put up to a potentially unhealthy, 90% humidity into the home.
- Motion activated garage exhaust fans detect vehicle entry and prevent potential fumes from entering the living space.

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Resource Efficiency



Making Compressed Earth Block on site.



Finger jointed studs from mill cutoffs.



Master bedroom vigas (natural beams) are salvaged from standing dead trees from a local forest.



Reclaimed hand hewn beams.

- Massive amounts of reclaimed materials, including 200 year old hand hewn beams from old growth walnut, oak, beech and black ash. The kitchen cabinets are made from old growth walnut (milled from hand hewn) as well as the bath vanities, laundry cabinets and built-ins. The pantry built-ins and ceilings in the media room and study are milled hickory. The entry door and study built-ins are constructed from ash barn beams.
- The wood flooring is FSC (Forest Stewardship Council) Certified quarter-sawn white oak. All interior doors are FSC Certified knotty alder. The Master Bedroom vigas, along with portal posts and pole rafters were standing dead from the nearby Pecos Valley. Portal beams are from a 1910 warehouse.
- Compressed Earth Block (CEBs) are made on site using site soil, added clay-rich soil and a small amount of Portland cement for stabilization. Most all the interior walls are constructed from these CEBs. The resultant thermal mass helps to hold in heat in the winter and cooler nighttime air in the summer. The mass also provides excellent sound insulating properties.
- Blown in cellulose insulation provides the finest thermal properties and utilizes virtually all recycled materials.
- Bathroom tile, several sinks, kitchen and bar splashes are made from high-content recycled glass.
- Cast iron bath tubs, as well as kitchen, guest bath, laundry and bar sinks feature 100% recycled content.
- The use of fly ash in the concrete, (waste captured in the smoke stacks of coal burning power plants) replaces a percentage of material in the concrete with far greater embodied energy.
- The Emerald Home demonstrates how a larger, custom home can be built with the embodied energy of a much smaller home. This is accomplished by the use of engineered wood products, reclaimed timbers, decking, flooring, doors and cabinets, glass tile, recycled cellulose insulation, Compressed Earth Block and many other products with high recycled content.

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Crane places one of three 1700 gallon cisterns (5100 gallons total) that catch 80% of the roof water.



The remaining 20% of the roof water flows into passive irrigation. The excess, during heavy storms, is directed into one of three retention ponds.



Daming the ends of the canales directs water directly down into catch basins.



Copper rain chains assure water flows into the catchment system even during windy conditions.

Water Efficiency

- All plumbing fixtures are low flow showerheads and faucets. The toilets are dual flush, using .8 gallons for minimal flush and 1.3 gallons for maximum flush. The average water consumption from these toilets is the lowest currently available.
- The OaSys hybrid air conditioners use half the water of conventional evaporative coolers and all back-flushing goes directly into the cisterns for irrigation.
- 100% of the roof water is captured, with 80% directed into one of the three 1700 gallon cisterns (5100 gallons) and the remaining 20% into passive irrigation where the water slowly drains from perforated pipe directed through numerous planting beds. The water from the cisterns is mostly gravity fed, though assisted by small solar pumps.
- The domestic water treatment system includes removal of chlorine, contaminants and scale, making it far healthier for bathing and drinking.
- The landscaping surrounding the Emerald Home is essentially drought tolerant and indigenous species, such as Pinon and Juniper which were used to replant the disturbed areas. Some exceptions are the deciduous trees planted along the wall of the south facing patio. They provide shade in the summer and allow for solar gain from the winter sun after they lose their leaves in the fall.

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Homeowner education is a fundamental aspect of green building. The awareness and practice of conserving energy and water is a far more sustainable approach than merely adding larger renewable energy and water catchment systems.

The City of Santa Fe has adopted the 2030 Challenge...a commitment to zero carbon emissions by the year 2030. The Emerald Home, in producing its own energy and having the absolute minimal carbon footprint with today's technologies, sets the tone for how the goals of 2030 can be achieved.

Though the amazing views of the Sangre De Cristo Mountains will be fully captured, the passive solar design aspects, thermal mass and the high-performance building envelope will align to produce amazing energy efficiency.

The future of custom home building has arrived...

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