

Suncadia Resort

This lodge-style resort home was built to the Five-Star or highest level of Built Green certification. It was a demonstration project for green building methods and technologies during its construction. Upon completion, the home was open to the general public for two months in the summer of 2006 where thousands of visitors learned about its sustainable features.

"I believe that more people would embrace green building if they knew they could do it without sacrificing style or comfort, especially if it also means a healthier indoor environment."

-Brenda Nunes, Project Owner/Developer

Custom Home Case Study

The Built Green Home at Suncadia



About the project

Project Background

The house was conceived as a green home demonstration project for Central Washington where there was not an established green home building program. Located on the eastern slope of the Cascade Mountains in Roslyn, WA, this home became the first Built Green-certified home in Kittitas County and achieved the highest rating of Five Stars from the King County Built Green Program. Many of the contractors and suppliers operate out of adjacent King County Washington, and share eco-systems that transcend the boundaries between counties. The rating was verified by a third party as also achieving Energy Star and will operate at 60 to 70 percent greater energy efficiency than an average conventional home.

Pre-Design Steps Taken

A volunteer steering committee was formed that included representatives from all facets of the home building industry: the builder, developer, resort representatives, home builders associations members, Energy Star, Built Green, products and materials suppliers, consultants, the local energy provider. This team helped shape the project and its educational mission. Sponsorships were accepted as a means of defraying costs; all proceeds were donated to the non-profit Built Green rating program that certified the home.

Resources

Energy Star: www.energystar.gov • Built Green: www.builtgreen.net
Project Web site: www.thebuiltgreenhome.com • King County's Green Building Program: www.metrokc.gov/dnrp/swd/greenbuilding

Energy Saving Technologies

Insulated Concrete Forms: Stronger, quieter, inert, nontoxic walls prevent mold growth; no offgassing; energy efficient with minimal air infiltration; easy to install.

Sealed Crawl Space: Less heat loss in ducts and pipes; freeze protection; reduces contaminants, mold and allergens; ductwork, piping and systems are contained in clean, conditioned space

Windows & Doors: Energy efficient, rated R2 to R4; provide UV light reduction on west and south; made of pressure treated wood that is wind and rain resistant.

On-Demand Tankless Water Heater: Up to 50 percent more energy efficient than traditional gas and 70 percent more than electric; heats water as needed, shuts off automatically; 25 year life span. System is partnered with recirculating control for switch- or motion sensor-activation; runs one cycle then shuts off.

Ground Source GeoThermal Heat Pump: Heating, cooling without conventional electricity using renewable energy source; no outdoor condensing unit; up to 5060 percent reduction in energy cost.

Radiant Floor Heating: Even distribution of heat for comfort; quiet in operation.

Heating & Air Conditioning System: High velocity improves indoor air quality while fitting in tighter spaces; combine with ground source geothermal heat pump; condensing/combi core boilers are 90 percent efficient; improved dehumidification; sealed hard pipe duct work; fan uses one-fifth the energy use.

Heat Recovery Ventilator: Improved indoor air quality; continuous fresh air filtered from outside; recovers heat from exhaust air in winter and cools incoming air in summer; controls excess humidity.



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**Special thanks to
Cheri Westphal of
Northwest Property Imaging
for providing photos .
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Catalytic Air Purification: Electrostatic Merv11 filter removes allergens electrostatically while ultraviolet light kills germs; "PhotoCatalytic Oxidation" eliminates odors & destroys toxic chemicals.

Foam Insulation: Prevents air infiltration; provides up to 50 percent energy savings vs. traditional insulation; insulated headers & corners (framing); breathable and water based; no off gassing and prevents mold growth; reduces HVAC equipment size requirements; provides superior pipe & sound insulation.

Energy Star Certified: Third party verified to be 60 percent more efficient with reduced electricity consumption; Energy Star-certified appliances; lower water and energy use; installed compact florescent light fixtures; lighting controls, timers or dimmers on incandescent fixtures; performance duct test and blower door tests to confirm operational objectives.

Interior Fixtures & Finishes

Glass: Kitchen counter is made from 75 percent recycled glass in a cement base. Glass tiles used for mosaics, bathrooms and accents are made from recycled glass that has been collected primarily from municipal recycling programs and is recyclable.

Wood Flooring: Teak and Australian chestnut certified by the Forest Stewardship Council as sustainably produced with a chain-of-custody validation; planks made from rapidly renewable cork harvested in a way that allows the tree to continue living.

Fixtures: Bronze and copper sinks and bathtubs are made from 100 percent recycled metals. Dual flush toilets have two choices – one for liquids that uses less water and one for solids.

Appliances: Selected for efficiency and Energy Star ratings, as well as water savings on dishwasher and clothes washer, using fifteen to 50 percent less energy than federal guidelines.

Wall Finishes: Low-VOC paints used throughout the home are Green Seal-certified for indoor air quality. Earth plaster applied by hand to basement walls is a natural clay-based surface that is hand-applied, non-toxic and does not require paint.

Cabinetry: Bookshelves, window seats and kitchen cabinets are made from sustainably produced wood certified by the Forest Stewardship Council, are formaldehyde-free and finished with low-VOC varnishes.

Indoor Air Quality: Many features combine to ensure healthier indoor air including a central vacuum system, low toxic finishes, no carpet, an air purifier, walk-off areas at entrances and radiant floor heating.

Site Development

Site-Cleared Trees: Logs from trees on site were milled at a local mill only two miles from site and used as fireplace mantle, porch timbers and interior beams and columns; allowed eight weeks drying time.



Drought-Tolerant and Native Landscaping: By using native and adaptive plantings, less water, pesticides and fertilizers are required, and natives also help counter invasive plant species.

Pervious Pavers: Driveway and patio areas paved with concrete "bricks" that allow rainwater to flow through and into the ground, retaining a more natural water flow.

Low Impact Development: Plants and soil are used to slow and treat stormwater naturally instead of installing large infrastructure pipes that are

typically used in residential projects.

Challenges

Materials sourcing: Access to "sustainable" materials was sometimes challenging in the rural area; for example, FSC-certified framing lumber was not available locally, so instead, conventional wood was used to frame and FSC wood was used for special finishes where it was more cost-effective to transport small quantities across the mountains.

Cost premiums: Some up-front costs were higher, but were chosen anyway for their long-term savings; for example, the spray foam insulation costs more than conventional fiberglass batts but it has superior performance for heating and cooling. Similarly, the geothermal heat pump has a higher initial cost, but uses renewable energy and eliminates the use of fossil fuels over the life of the house, resulting in long-term energy savings.

Installation: Occasionally, certain products had a similar cost to conventional products but the installation required specialized knowledge specific to the product and therefore had a "learning curve." For example, Tigerwood decking requires pre-drilling for installation due to its density.

Lessons Learned & Recommendations

For a custom home, many of the choices were similar or the same as for a conventional custom project. Premium green products may have a similar cost to premium conventional building materials, but they have the extra environmental benefits. By specifying and installing green materials, the market for such environmentally preferable products is increased.