



Moving Toward Zero Energy Homes

The U.S. Department of Energy's Zero Energy Homes research initiative is bringing a new concept to homebuilders across the United States. A Zero Energy Home (ZEH) combines state-of-the-art, energy-efficient construction and appliances with commercially available renewable energy systems such as solar water heating and solar electricity. This combination can result in net zero energy consumption from the utility provider. Zero Energy Homes are connected to the utility grid but can be designed and constructed to produce as much energy as they consume annually.

Zero Energy Homes have a number of advantages:

- Improved comfort—an energy-efficient building envelope reduces temperature fluctuations.
- Reliability—a ZEH can be designed to continue functioning even during blackouts.
- Security—a home that produces energy protects its owner from fluctuations in energy prices.
- Environmental sustainability—a ZEH saves energy and reduces pollution.

Zero Energy Homes optimize a variety of features:

- Climate-specific design
- Passive solar heating and cooling
- Energy-efficient construction, appliances, and lighting
- Solar thermal and solar electric systems.

Recent Successes

Pardee Homes' Ultimate Family Home is a featured show home for the 2004 International Builders' Show in Las Vegas, Nevada. This attractive 5,300-square-foot home provides all the amenities needed by today's families, with the added bonus of being a Zero Energy Home. Designed to be highly energy efficient and powered by 8 kilowatts of solar electricity and 1.5 kilowatts of solar thermal energy, the home is expected to use 90% – 100% less energy than a home built to code. The home also features solar collectors that provide hot water for the home.

Clarum Homes held a grand opening in August 2003 of an entire subdivision of 257 homes that approach zero energy consumption (near-ZEHs) at Vista Montaña in Watsonville, California. The subdivision will be made up of highly energy-efficient town homes, entry level and move-up single-family homes. All homes will have solar electric systems that will provide at least 50% of the annual energy demand.

Morrison Homes held a grand opening for their Lakeside community in Elk Grove, California in June 2003. They plan on at least 10% of the homes also being near-ZEHs when the community is complete. Both Clarum and Morrison are part of the ENERGY STAR® program, which requires efficiency standards beyond California's strict Title 24 requirements.

In April 2003, **John Wesley Miller Companies** completed the first Zero Energy Home in Arizona. The home, located in Tucson's Armory Park del Sol neighborhood, sold in May 2003. In addition to being highly energy efficient, this Zero Energy Home features solar electric and solar heating systems that will provide 100% of the annual energy load.

In the summer of 2002, **Centex** completed and sold their 21st Century Performance Home in the Los Olivos community in Livermore, California. In addition to being highly energy efficient, this Zero Energy Home also features solar electric and solar water heating systems that provide 90% – 100% of the home's annual energy use.



SheaHomes built a three-hundred home development in San Diego, California in 2001. All of the homes are up to 38% more energy efficient than Title 24 requirements, and all three hundred homes have solar water heaters. In addition, one hundred of the near-ZEHs have solar electric systems that generate 40% – 60% of the home's energy use.

Partnerships

The Department of Energy (DOE) selected four teams that will work with researchers at DOE's National Renewable Energy Laboratory to introduce the ZEH concept into the single-family, new-home construction industry. The four teams are lead by ConSol in Stockton, California, Davis Energy Group in Davis, California, NAHB Research Center in Upper Marlboro, Maryland, and Steven Winter Associates in Norwalk, Connecticut, and include the following homebuilder partners:

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