



The New American Home 2019

Thermal Shell

- Unvented and air sealed attic with a combination of Owens Corning roof insulation sheathing (R-10) and Owens Corning PROPINK Complete™ Blown-in (R-57) Total of R-67
- Western Windows and patio doors with low-e coating and argon gas fill to limit solar heat gain and optimize air tightness
- Owens Corning PROPINK Complete™ Blown-in Wall System (R-46)
- Owens Corning FORMULAR™ Exterior Wall sheathing Insulation (R-10)
- Owens Corning Slab Insulation (R-10)
- AeroSeal's AeroBarrier aerosol thermal envelope sealer utilized to further reduce envelope leakage
- Large overhangs to aid in protecting the home from the harsh Nevada sun
- Light colored exterior to assist in reflecting the sun

HVAC

- Mitsubishi's Variable Refrigerant Flow (VRF) Ducted Split-System Heat Pump HVAC system provided space conditioning
- Variable speed compressors in outdoor heat pump units adds efficiency and quietness
- Lifebreath's Energy Recovery Ventilator (ERV) quietly provides fresh air while reducing the loads on the HVAC system
- Mechanical ventilation with humidistat or occupancy controllers provided by Panasonic
- Space conditioning system located entirely within the conditioned space
- Total Duct Leakage tested at 4.5 CFM25 per 100 sq.ft. and confirmed to be within ENERGY STAR® parameters
- Duct Leakage to the Outdoors tested at 2.0 CFM25 per 100 sq.ft. and confirmed to be within ENERGY STAR® parameters

Hot Water

- Bosch ENERGY STAR®-rated tankless water heaters with an efficiency (EF) of 0.99
- Insulated hot water lines utilized throughout the project to reduce heat loss

Electrical

- 100% energy-efficient LED lighting for all interior and exterior lighting
- Thermador's ENERGY STAR®-rated appliances, including dishwasher, refrigerator, freezer, and clothes washers
- Pentair ENERGY STAR®-rated variable speed pool pumps

Energy Efficiency and Innovation

As one of the NAHB's official show homes, The New American Home (TNAH) 2019 is a symbol of energy efficiency and innovation. The home exhibits innovative products from manufacturers all over the world. A noteworthy feature of TNAH 2019 is the proposed air tightness of its thermal shell. AeroSeal's AeroBarrier aerosol thermal envelope sealer was utilized before drywall had been finished. The tested air changes per hour at 50 Pascals (ACH50) prior to AeroBarrier's application was 14 ACH(50), and after application; 2.06 ACH(50). A remarkable 679% improvement!

TNAH 2019 is designed to exceed the requirements for certification to the Emerald level of the National Green Building Standard™ (NGBS). Its energy-efficient features can be used in homes in a hot climate at any price point with similar energy savings. The home is also certified EPA Energy Star, as well as, the EPA's Indoor airPLUS certification.

Two Trails, Inc. worked closely with Sun West Custom Homes to ensure energy efficiency and innovation in TNAH 2019. This home has a registered HERS Index of 45. It is 55% more efficient than the average new code-built home. At this level of energy efficiency, the home is designed to provide over \$3,009 in annual energy savings to the home owner.



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Water Efficiency

In addition to energy savings, this home's calculated monthly water savings is a remarkable 58.17%. This incredible water use reduction is made possible using low-flow water fixtures, natural indigenous landscaping, and a high-efficient irrigation system.

Proposed water saving features include:

- Kohler low-flow, EPA WaterSense certified 1.2 & 1.5 GPM lavatory faucets and 1.28 GPF toilets provides the indoor water use reduction
- High-efficient micro spray, drip-lines and irrigation controller contributed to the outdoor water use reduction

Designed Indoor Environmental Quality Features

Indoor Environmental Quality encompasses the conditions inside a home, and their effects on residents. The New American Home 2019 incorporated innovative strategies, creating an indoor environmental quality that enhance the lives of homeowners, protects occupants' health, and improves quality of life.

Indoor Environmental Quality strategies include:

- Sherwin Williams Low-VOC paints and finishes and low-VOC interior adhesives and sealants
- MERV 13 space conditioning air filters
- HVAC ducts sealed during construction to prevent pollutants from construction activities from entering the system
- Whole Building ventilation system configured to allow the correct amount of fresh air in to the home
- Eco-Friendly cabinets – Formaldehyde free and material certified by the Forest Stewardship Council
- Eco-Friendly flooring – Carpet and Rug Institute's Green Label certified flooring products

Systems Engineering Approach

The systems-engineering approach unites segments of the building industry that have previously worked independently of one another. The concept is simple: systems-engineering can make America's homes cost effective to build or retrofit and energy efficient to live in. Energy consumption of new houses can be reduced by as much as 40% with little or no impact on the cost of construction.

To reach this goal, the Sun West Custom Homes team is working with their building partners to produce a home that incorporates energy and material saving strategies from design through construction. First, the team analyzed and selected cost-effective strategies for improving home performance. Next, the team evaluated design, business, and construction practices within individual partnerships to identify cost savings. Cost savings could then be reinvested to improve energy performance and product quality. For example, a design that incorporates new techniques for tightening the building envelope enabled Sun West Custom Homes to install smaller, less expensive heating and cooling systems. The savings generated in this process can then be reinvested in other high-performance features to further reduce energy use. Proving the efficiency of the system-engineering approach to construction, this home's HERS Index, without the use of a Photovoltaic system is 45, which is 55% more efficient than the construction of the average new home.

The "pilot" or "test" home is the field application of solution design. The team assisted Sun West Custom Homes in designing TNAH 2019 in accordance to strategic design, modeling to maximize building efficiency of each system and directed the team to increase efficiency through cost effective decisions. Before additional houses are built, these changes are incorporated into the design. This process of analysis, field implementation, reanalysis, and design alteration facilitates ultimate home performance once a design or retrofit strategy is ready for use in production or community-scale housing.

Understanding the interaction between each component in the home is paramount to the systems-engineering approach. Throughout design and construction, the relationship between building site, envelope, mechanical systems, and other factors is carefully considered. Recognizing that features of one component can dramatically affect the performance of others enables the Sun West Custom Homes Building team to value-engineer energy-saving strategies at little or no extra cost.



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