The New American Home 2024

Thermal Envelope

- Unvented and air sealed attic insulated with Holcim EasySeal.5™ open-cell spray-foam insulation (R-22.86).
- Western windows and doors with low-e coating, argon gas fill limits solar heat gain and optimizes air tightness. (U-factor average 0.34 and SHGC average of 0.24).
- Exterior frame walls sheathed with Carlisle Board insulation (R-4.2) and wall cavities insulated with Holcim EasySeal.5™ open-cell spray-foam insulation (R-15.24) and Fi-Foil Hi-Fi (R-7.1) reflective wall insulation (Total R-26.54).
- AeroBarrier building envelope air sealing.
- Overhangs to aid in protecting the home from the harsh Nevada sun.
- Light colored exterior to assist in reflecting the sun.
- Air infiltration performance tested on-site resulted in 0.35 ACH(50).
  An effective combined leakage area of the thermal envelope of just 29.4 square inches. The base code for this home's leakage rate, at 3.0 ACH(50) is 261.8 square inches, making the tested envelope leakage rate 11.23% of base code.

HVAC

- LG's Multi-V, Variable Refrigerant Flow (VRF) System provides space conditioning (17.68 SEER and 10.93 HSPF average).
- Mechanical ventilation provided by Broan NuTone's AI Series.
- Space conditioning system to be located entirely within the conditioned space, minimizing any conditioned air leaking to the exterior.

Water Heaters

- Rinnai ENERGY STAR®-rated tankless water heaters (0.95 UEF).
- Enovative AutoHot on demand hot water recirculating pumps.

Electrical

- 100% energy-efficient Progress LED lighting for all interior and exterior Kichler lighting.
- LG Signature Kitchen Suite ENERGY STAR®-rated appliances.
- Pentair IntelliFlo3® VSF ENERGY STAR®-rated variable speed pool pumps.

Solar Array

- 31.08 kW renewable energy solar array utilizing 84 Solaria PowerXT 370-watt solar panels with 84 Enphase IQ7A Microinverters.

Energy Efficiency and Innovation

As one of the NAHB's official show homes, The New American Home (TNAH) 2024 is a symbol of energy efficiency and innovation. Its energy-efficient features can be used in homes in a hot climate at any price point with similar energy savings. The home exhibits innovative products from manufacturers all over the world. TNAH 2024 is designed to exceed the requirements for certification to the Emerald level of the National Green Building Standard™. The home is certified to the EPA ENERGY STAR® for Homes, the EPA's Indoor airPLUS and the DOE Zero Energy Ready Home standards.

Two Trails, Inc. worked closely with Sun West Custom Homes to ensure energy efficiency and innovation in TNAH 2024. Without the solar array, this home has a projected HERS Index of 54, 46% more energy efficient than the average code-built home. The home incorporates 84 high-efficient Solaria PowerXT 370-watt solar panels to power its electrical systems. The registered HERS Index with Solar PV system is a -45!

Water Efficiency Features

In addition to energy savings, this home is designed to achieve an estimated 50% reduction from baseline in water use. This remarkable water use reduction is made possible using low-flow water fixtures, natural indigenous landscaping, and a high-efficient irrigation system. Water saving features include:

- Kohler low-flow, EPA WaterSense certified 1.2 GPM lavatory faucets and an average of 1.28 GPF toilets provides indoor water use reduction.
- High-efficient micro spray, driplines and irrigation controller contributed to the outdoor water use reduction.

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Indoor Environmental Quality Features

Indoor Environmental Quality encompasses the conditions inside a home, and their effects on residents. The New American Home 2024 incorporates 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 AC air filters.
- HVAC ducts are 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 into the home.
- Eco-Friendly cabinets – Formaldehyde free and material certified by the Forest Stewardship Council.

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 projected HERS Index, without the use of a Photovoltaic system is 54, which is 46% more energy efficient than the construction of the average code-built home. The registered HERS Index with Solar PV system is a -45!

The "pilot" or "test" home is the field application of solution design. The team assisted Sun West Custom Homes in designing TNAH 2024 in accordance with 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 facilitate ultimate home performance once a design 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 team to value-engineer energy-saving strategies at little or no extra cost.