



TNAH® 2009 Energy Use Summary

Energy Use Summary

The technologies and strategies implemented for The New American Home® 2009 in Las Vegas, Nevada allowed it to achieve a very high level of energy efficiency. The energy performance highlights of The New American Home® 2009 can be summarized as follows:

- The house achieves 55% whole house energy savings when compared to the Building America benchmark (which is generally consistent with mid-1990s standard practice) without on-site electrical generation. With on-site electrical generation via solar panels, the house achieves 76% whole house energy savings when compared to the Building America benchmark.
- The house is estimated to use only 4,239 kWh/year in electricity due its energy efficiency, the use of natural gas for cooling, heating and hot water production, and the extensive use of photovoltaic (solar) panels that generate electricity for the house. Its electrical bill is estimated to be \$467 per year (based on a rate of 11¢/kWh and no service charges).
- Total utility costs for the house, which include electricity and natural gas usage, are expected to be about \$2,500 per year (not including service charges). Each square foot of air conditioned floor area (8,721 square feet in total) will only require 29¢ in utility costs annually.
- Energy savings for the cooling system are estimated to be 75%, with heating system savings estimated to be 67%.

The energy efficiency specifications and strategies implemented in The New American Home® 2009 include:

- Basement foundation walls and most exterior walls consist of an R-21.7 (8" core, 12½" thick) insulated concrete form system.
- The attic is unvented and sealed air tight. An open-cell, spray foam insulation (R-20 minimum) was used at the underside of the roof deck. On the exterior side of the roof deck, R-7 closed cell spray polyurethane foam insulation (1" average thickness) was used.
- Aluminum clad, wood-framed windows with low-e coating were used to limit solar

heat gain. Picture windows have performance values of $U = 0.34$ and $SHGC = 0.23$; casement $U = 0.35$, $SHGC = 0.16$; and patio door $U = 0.34$, $SHGC = 0.19$.

- Airtightness of the building shell was increased through sealing of penetrations and openings to achieve 0.21 natural air changes under blower door testing.
- Space conditioning is provided by a gas-engine driven heat pump, mini-split system. The system has a performance value for heating of $COP = 1.5$ and cooling, $COP = 1.5$. The system uses air handlers/cassettes for air distribution which are contained within ceiling assemblies.
- Some air handlers/cassettes are ducted. All ductwork is sealed for airtightness.
- Mechanical ventilation is provided by ductwork that draws outdoor air to key air handlers where it is treated before entering the house.
- Natural gas fueled tankless water heaters ($EF=0.82$) provide hot water heating. A solar thermal hot water system heats swimming pool water.
- A minimum of 40% of all interior lamps are light emitted diode (LED) or compact fluorescent based.
- Energy Star labeled appliances (including dishwasher, freezer, clothes washer and refrigerator) are throughout the house.
- A 10.64 kW (DC) photovoltaic system, consisting of 56 solar panels that capture solar energy from both panel faces, generates electricity.