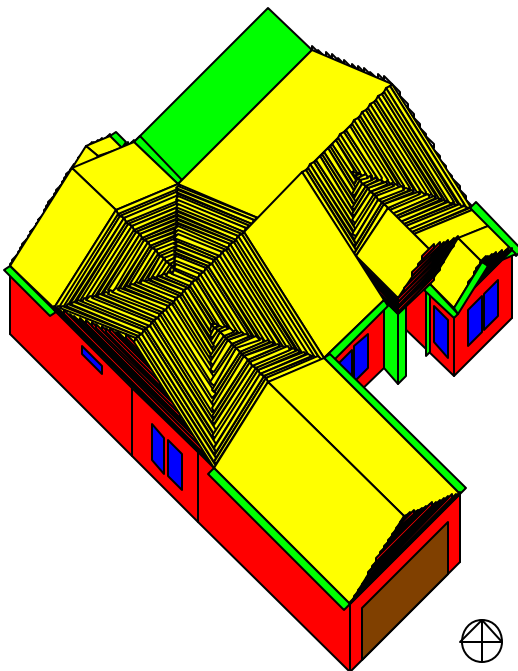


Put it Where?



Is it more effective to insulate a house with an attic at the ceiling level, or to insulate directly under the sloped roof? This issue has been the subject of debate among many energy conservation professionals, including those involved in **CARB** and the other **Building America** teams. Preliminary results from recent analysis conducted by CARB on a **Del Webb** house in Phoenix, Arizona, indicate that insulating at the ceiling level is, by far, more effective. **Steven Winter Associates, Inc. (SWA)** ran DOE-2.1E energy analyses on two houses of the same design, the only difference being the location of the insulation. In the “conventional” building, R-38 fiberglass batt insulation was placed in the ceiling below the unconditioned attic space. In the “unconventional” house, R-19 cellulose insulation was placed at the attic gable walls, while R-22 cellulose insulation was placed at the truss top chord of the unvented roof structure. All of the other exterior walls and all of the windows were identical. The buildings were simulated for an entire year, using hourly weather data. DOE-2 calculates the hour-by-hour energy use of a building based on location, construction, HVAC systems, occupancy, and operation. (A drawing of the house simulated is shown at left.) In comparing energy consumption, the unconventional house used 23% more electricity to cool and 42% more natural gas to heat. Subsequent DOE-2 modeling, in which relatively leaky HVAC equipment and ducts were placed in the unconditioned attic of the conventional house, revealed that the standard insulation/HVAC package still outperformed the unconventional method of insulating at the roof plane by nearly 10%.

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