Building America Efficient Solutions for New Homes

Case Study: Schneider Homes, Inc.

Village at Miller Creek | Burien, WA

PROJECT INFORMATION

Construction: New home

Type: Single-family

Builder: Schneider Homes, Inc., Tukwila, WA, (206) 248-2471 www.schneiderhomes.com

Size: 2,019 ft^2

Price Range: $350,000 average

Date Completed: 2008

Climate Zone: Marine, IECC Zone 4

Team: Building Industry Research Alliance (BIRA)

PERFORMANCE DATA

HERS Index: 66-68

Projected annual energy cost savings: $1,144

Added first cost of energy-efficiency measures: $3,922

Annual mortgage increase: $313

Annual net cash flow to homeowner: $831

Billing data: Not available

Building America U.S. Department of Energy

In 2008, Schneider Homes earned federal tax credits for 28 of its 37 homes at the Village at Miller Creek, a detached townhouse development in Burien, Washington. To be eligible, these homes achieved greater than 50% energy savings in heating and cooling over the 2004 International Energy Conservation Code (IECC). The homes also met the Building America 40% whole-house energy-savings goal for the marine climate.

Schneider Homes used data analysis from Building America (through Washington State University's Extension Energy Office, a member of Building America's BIRA team) to determine how to achieve such significant energy savings. The data showed Schneider Homes already achieving some energy savings by properly air sealing homes to meet the Northwest ENERGY STAR standards. Contractors caulked all mechanical penetrations, foamed the bottom and top plates of walls, and used gaskets for attic access hatches, resulting in initial testing data of 3.9 to 4.4 air changes per hour at 50 pascals (ACH@50).

Because the 37 homes were being built near Seattle's major airport (Sea Tac) the contractors installed R-23 sound-reducing insulation in the 2x6 wall cavities. This Johns Manville Spider® Custom Insulation is a blown-in blanket system (BIBS) with a non-hazardous adhesive. The attic insulation is blown-in cellulose R-38 to R-42 depending on the unit.

Based on Building America data, Schneider Homes moved the furnace and ducts into conditioned space. The house designs contained open-web trusses between the first and the second floors. "We put the ducts on the warm side of the insulation blanket in the floor trusses over the unheated garage," said Pat Shea, the project manager. A portion of the return duct is outside conditioned space within the attic. For most homes, the gas furnaces, rated at 92.5 AFUE (annual fuel utilization efficiency), were placed in conditioned closets within the garage.

(Photo top left) Schneider Homes worked with researchers at Washington State University's Extension Energy Office, a member of Building America's BIRA (Building Industry Research Alliance) to design 28 homes near Seattle to qualify for a federal energy-savings tax credit.

KEY ENERGY-EFFICIENCY MEASURES

HVAC:

- Forced-air 92.5% AFUE gas furnace in conditioned closet
- Ducts in conditioned space, sealed to 3.0 to 4.0 CFM/100 ft^2 @25 Pa
- Mechanical upgraded bathroom exhaust

Envelope:

- 2x6 16-inch on-center
- **Air sealing:** Gasketing attic access hatches, foaming bottom and top plates, and caulking all penetrations
- **Wall insulation:** R-23 formaldehyde-free blown-in fiberglass insulation
- **Attic insulation:** R-38 to R-42 blown-in cellulose insulation
- **Windows:** Double-pane, low-e, vinyl windows, U = 0.34, SHGC = 0.35, 15% glazing area

Lighting, Appliances, and Water Heating:

- 80% compact fluorescent lighting
- ENERGY STAR® refrigerator, dishwasher, and clothes washer

For more information, please visit:
www.buildingamerica.gov

An insulated, conditioned closet within the garage contains the forced-air 92.5% AFUE gas furnace.

Other energy reduction features include installing sound-reducing, two-pane, low-emissivity windows with vinyl frames (U=0.34); making 80% of the light fixtures hardwired for compact fluorescent light bulbs; providing an ENERGY STAR refrigerator, dishwasher, and clothes washer; and installing an 80% energy-efficient gas tankless water heater.

Lessons Learned

- Analysis from the Building America BIRA research team showed that moving the furnace and ducts into conditioned space would result in significant energy savings.
- For a housing development, if builders are installing tankless water heaters, they need to plan the infrastructure for larger-diameter gas piping to the homes. Schneider Homes replaced about six gas tankless water heaters with 40-gallon water heaters after homeowners complained about the pressure and temperature of their water, which resulted from the gas pipes not being able to handle the increased demand for BTUs during high-use times like 6:00 a.m.
- With planning, high-performance homes do not need to cost more. When increased first costs for energy saving features were added to the mortgage, they added $314/year to mortgage costs but energy savings were projected to be $1,144/year for annual net cash flow to the homeowner of $831. In addition, Puget Sound Energy provided approximately $1,000 in ENERGY STAR rebates per house for energy-efficient building, and 28 of the homes qualified for the $2,000 federal tax credit.

"The [Puget Sound Energy] rebate that we received through ENERGY STAR and the federal tax credit more than offset the additional construction cost [for the energy upgrades]."

Pat Shea, Schneider Homes, project manager for single-family construction

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The U.S. Department of Energy's Building America program is engineering the American home for energy performance, durability, quality, affordability, and comfort.