Building America Case Study
Whole-House Solutions for New Homes

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: 65-68

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

Schneider Homes worked with the U.S. Department of Energy's Building America program to design 37 energy efficient homes at the Village at Miller Creek, in Burien, Washington.

Schneider Homes used analysis from Washington State University's Extension Energy Office, a member of Building America's BIRA team, to determine the most cost-effective measures for significant energy savings. The homes were air sealed according to the EPA thermal bypass checklist. Contractors caulked all mechanical penetrations, foamed the bottom and top plates of the walls, and used air-sealing gaskets for the attic access hatches, resulting in blower door test results of 3.9 to 4.4 air changes per hour at 50 pascals (ACH@50).

Because the 37 homes were built near Seattle's major airport (Sea Tac) the builder installed dense-packed fiberglass in the 2x6 wall cavities to provide sound proofing and an R-23 insulation level. The attics were insulated with blown-in cellulose to R-38 to R-42, depending on the unit.

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.

Building America U.S. Department of Energy

(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 team) 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

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Other energy-efficiency features included 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.

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

Lessons Learned

- Analysis from the Building America research team showed that moving the furnace and ducts into conditioned space was one of the biggest energy savings.
- The builder found that a larger-diameter gas line should have been installed to bring natural gas into the development, since all of the houses had tankless water heaters. Schneider Homes replaced the tankless water heaters with tank water heaters in six homes after the homeowners complained about the lack of water pressure and low temperatures in the morning.
- 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 an 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 construction, 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

U.S. DEPARTMENT OF ENERGY
Energy Efficiency & Renewable Energy

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