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

BUILDING TECHNOLOGIES PROGRAM

Building America Best Practices Series

Builders Challenge Guide to 40% Whole-House Energy Savings in the Marine Climate

Case Study: New Tradition Homes

Landover Commons | Vancouver, WA

Despite the slow economy, New Tradition Homes is one of only a handful of builders who continued to build and sell new homes in southwest Washington during the recession thanks to energy-efficient design changes made with help from Building America's Building Industry Research Alliance.

BUILDER PROFILE

Builder's Name: New Tradition Homes

Where: Vancouver, Washington

Founded: 1988

Employees: approx. 25 (without subs)

Size: 6,000 homes since 1988

Square Footage: two-story, three-bedroom, 1,625 to 2,304 sq. ft.

Development: Landover Commons, Vancouver, WA, 94 units

Price Range: $180,000 - $399,000 (fall 2009 prices)

Energy Efficient Commitment: All Northwest ENERGY STAR, all Earth Advantage

Building AMERICA U.S. Department of Energy

A Culture of Energy Efficiency

The Landover Commons community in Vancouver, Washington, is a great example of production builder New Tradition Home's commitment to keep improving. All 94 homes achieve Northwest ENERGY STAR and the gold level of Earth Advantage (a regional efficiency program). With input from the U.S. Department of Energy's Building America Program, New Tradition has committed to building the newest 13 homes at Landover Commons to even higher levels of efficiency to qualify for the federal tax rebate, which requires heating and cooling energy savings of 50% over the 2004 International Energy Conservation Code.

The Federal Tax Credit homes include ducts and air handlers in conditioned space. One includes a tankless water heater. starting in January 2009, New Tradition committed to including tankless water heaters, 93% efficiency gas furnaces, and 100% CFL lighting in all of its homes in southwest Washington and eastern Washington.

"New Tradition Homes is committed to building energy efficiently, even implementing its own building science team, a step most builders across the nation have yet to take," said Steve Vang of Building America's Building Industry Research Alliance (BIRA) team.

Commitment to Energy Efficiency Nets Builder Regional and National Awards

In both 2007 and 2008, New Tradition Homes won the Regional ENERGY STAR Builder of the Year award, which is given each year to only one builder in the four-state region including Oregon, Washington, Idaho, and Montana. In 2009 New Tradition Homes was recognized with an ENERGY STAR Leadership in Housing Award.

(top) Water conservation features include water-conserving bath faucets, a rain sensor on lawn sprinklers, and native Northwest landscaping. Roofing material contains a minimum 40% recycled content, concrete driveways contain recycled flyash, a recycled byproduct of coal burning, and construction lumber waste is recycled.

(bottom) Locating the ducts and airhandler in conditioned space was a significant step toward increasing the homes' energy performance and indoor air quality. New Tradition installed the ducts in a duct chase in a dropped ceiling, shown here before and after drywalling. *(Photo source Mike Lubliner, WSU Energy Office)*

Energy Efficiency, Comfort, Health, and Sustainability

New Tradition began working with DOE's Building America program in 2004. In January 2005 New Tradition Homes joined the Earth Advantage program and began building all of its homes in southwest Washington to their green and high performance standards. In 2006 New Tradition became the first southwest Washington builder to commit to making all of its homes to Northwest ENERGY STAR. Since 2005 it has certified more than 950 Earth Advantage homes and 500 ENERGY STAR homes.

Building America research shows one of the most significant things a builder can do to improve a home's energy performance is to move ducts into conditioned space. Working with Building America and its HVAC contractor, New Tradition has experimented with several ways to incorporate ducts in conditioned space in all its existing home plans including putting ducts in a dropped hallway ceiling chase, running ducts between floors through open-web floor trusses, and framing in ducts in the attic.

"Our goal is to bring all ducts into conditioned space. In this economy that would be a difficult move to make all at once, but we are incrementally working toward that, plan by plan," said Steve Tapio, head of New Traditions' building science team.

Attic insulation was increased over ENERGY STAR homes from R-38 to R-49 blown-in cellulose. The federal tax credit homes have slab-on-grade foundations. New Tradition has also used vented crawlspace foundation, which are common in the northwest. The key is good site drainage and New Tradition excels at site moisture management.

Excavators raise the building site, dig out the crawl, grade it flat, then dig out a sloped trench diagonally across the crawlspace that exits to a low-point drain sleeve with a one-way valve to let water out but not in. This drain sleeve directs the water to an infiltration system (a drywell) or out to the street via a curb cut. Once the sloped trench is dug, 4 to 6 inches of crushed rock are laid over the entire crawlspace and foundation area. Then the concrete footing, stem, and foundation are poured on top of the rock. When the house is complete, 6-mil plastic is laid over the crawlspace ground. A water-proof gasket separates the foundation stem wall from the sill plate. Damp proofing and dimpled plastic drainage sheets are applied to exterior of foundation walls, and a perimeter drainage pipe is laid at the footing. Homes are wrapped with Tyvek Drainwrap that is overlapped shingle fashion and taped at seams to serve as a continuous drainage plane. All wall penetrations are gasketed to prevent water leakage.

Every house comes equipped with a whole house energy usage monitor so homeowners can track their electricity usage and dollars spent in real time. The homes are equipped with ENERGY STAR dishwashers; ENERGY STAR refrigerators and clothes washers are offered. Hard-wired lighting is 100% CFL. The low-emissivity, argon-filled double-pane windows have a U value of 0.32 or better. The walls are constructed with 2x6, 16-inch on-center wood-framing and insulated to R-21 with GreenGuard-certified EcoBatt non-offgassing insulation that is properly installed to avoid gaps and voids.

A fresh air intake is ducted to the air handler return air plenum; a timer operates both the air handler and a mechanical damper on the air intake duct to open the damper, drawing fresh air into and through the house on a continuous on-off cycle throughout the day. Additional ventilation is provided by low-sone ENERGY STAR bath and laundry fans. Transfer grilles between rooms balance pressures and encourage air circulation. Other indoor air quality features include a 4-inch high-efficiency air filter on the furnace, the use of only low-VOC paints, and GreenGuard-certified laminate kitchen countertops.

New Tradition's quality management program includes an in-house building science team, a corporate commitment to energy efficiency, ongoing training of staff, participation in federal and regional energy-efficiency programs, hiring a dedicated air sealing contractor, third-party performance testing, consumer research, and an ongoing interactive relationship with an HVAC contractor interested in high quality. New Tradition uses a trained and certified home weatherization contractor whose only responsibility is caulking and sealing everything not sealed by the other trades. All wall penetrations are sealed per the ENERGY STAR Thermal Bypass Checklist.

Dollars and Sense

As calculated by BIRA, Table 1 shows the energy savings New Tradition achieved in its 2,264-square-foot house compared to a house built to the Building America benchmark (MEC 1993) and a house built to the Washington state code for 2006. The New Tradition home achieved calculated energy savings of 44.1% over the Building America benchmark.

As shown in Table 1, even with $3,635 in increased builder costs, annual energy cost savings are sizable enough to offset increased mortgage costs, resulting in an annual net positive cash flow to the home buyer of $700 per year, not including any federal or local tax rebates or incentives.

New Tradition's own survey of local realtors found 9 out of 10 reporting that homebuyers are inquiring about the energy-efficient features of a home before they buy. The incentive to choose an energy-efficient home is made even stronger when home buyers can be shown that the investment would actually put them dollars ahead of a standard home purchase.

Key Features

- Air handler in sealed utility closet
- Ducts in conditioned space
- SEER 14 AC
- 93% efficient sealed-combustion gas furnaces
- Dedicated weatherization contractor for caulking and sealing
- Third party duct blaster and blower door testing on one of every three homes
- Meets Northwest ENERGY STAR and Earth Advantage criteria
- Air sealing per ENERGY STAR Thermal Bypass Checklist
- ENERGY STAR low-emissivity, argon-filled double-pane windows U-0.32
- Tankless gas water heaters
- Whole House Energy Usage Monitor that tracks electricity usage and dollars spent in real-time
- R-21 GreenGuard-certified EcoBatt wall insulation
- R-49 blown-in cellulose attic insulation
- ENERGY STAR refrigerators, dishwashers, and clothes washers
- 100% hardwired CFL lighting
- Fresh air intake ducted to airhandler return
- Low-sone ENERGY STAR bath and laundry fans on timer for continuous ventilation
- Transfer grilles to balance room air pressures
- Low VOC paints, GreenGuard certified laminate countertops, recycled content roofing and flyash concrete
- Water-conserving bath faucets, a rain sensor on lawn sprinklers, and native Northwest landscaping.

Table 1. Estimated Costs and Energy Savings for a New Traditions home (2,264 square feet) compared to Building America benchmark and Washington State Energy Code homes

Energy Efficient Features of the Building America Home	% Energy Savings Per Year		Annual Utility Bill Savings[a]	Estimated Consumer Cost[b]	Annual Increase to Mortgage Cost[c]
End Use	Vs. Benchmark[d]	Vs. WA Code	Vs. Benchmark		
Space Heating, includes	25.9%	10.4%	$651.96		
• Moving ducts in conditioned space				$742.50	$59.28
• Duct and envelope sealing, and testing				$1,485.00	$118.56
• 92.5% AFUE furnace				$495.00	$39.52
• R-49 attic insulation				$352.00	$28.10
61% Energy-efficient Water Heater	2.1%	1.7%	$57.45	$165.00	$13.17
70% CFL Lighting	6.6%	8.7%	$110.25	$132.00	$10.54
ENERGY STAR Appliances	3.4%	5.4%	$67.26	$264.00	$21.08
Space Cooling	6.2%	0.1%	$103.69	-	-
Total Usage/Savings	**44.1%**	**26.2%**	**$990.61**	**$3,635.50**	**$290.25**
Annual Utility Bill Savings vs. Benchmark					**$990.61**
Net Annual Cash Flow to Consumer					**$700.37**

(a) Based on Clark Public Utilities electricity rates for Vancouver, Washington, of $0.0736/kWh and Northwest Natural gas rates of $1.128/therm. Energy usage and savings values are in source energy and not site energy. The annual utility bill savings were calculated by BIRA using the computer model BEopt. It should be noted that this savings includes no fluctuations in utility rates or inflation.

(b) Consumer costs include an assumed 10% markup to the builder's cost. Builder costs based on talks with TWC.

(c) Assumes a 7% loan over 30 years with inflation not considered. Net cash flow does not include the $2,000 federal tax credit or the $1,000 per home tax credit from Energy Trust of Oregon for reaching the federal tax credit level.

(d) The benchmark represents a house built in the 1990s. DOE uses the benchmark to consistently calculate energy and financial performance for consumers for energy-efficient features.

When asked how much it costs to build to these levels, Tapio said, for a builder who is currently building just to code, trying to jump up to the federal tax credit level in one leap would probably seem cost prohibitive, costing $3,000 to $5,000 per home. However, Tapio saidNew Tradition was able to implement changes gradually, by working with Building America and vendors to identify cost-effective products.

Bottom Line

"With the economy the way it is and the number of existing houses on the market, the only builders in Clark County doing new construction and still selling are builders like New Tradition, who are building really energy-efficient homes," said Chris Taylor, the installation manager at Area Heating and Cooling, New Tradition's HVAC contractor. "If I was going to buy a new home myself in Clark County, I wouldn't buy anything but a New Tradition home," said Taylor.

For More Information

Contact the EERE Information Center 1-877-EERE-INF (1-877-337-3463) or visit eere.energy.gov/informationcenter.

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