

# Amaris Homes

Fishers Circle  
Vadnais Heights, MN



## BUILDER PROFILE

Amaris Homes LLC, Maplewood, MN  
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## FEATURED HOME/DEVELOPMENT:

### Project Data:

- Name: Fishers Circle
- Location: Vadnais Heights, MN
- Layout: 3 bedrooms, 2 baths, 1 floor
- Conditioned Space: 1,882 ft<sup>2</sup>
- Climate Zone: IECC 6A, cold
- Completion: March 2015
- Category: Custom

### Modeled Performance Data:

- HERS Index: without PV 47, with PV 22
- Projected Annual Utility Costs: without PV \$1,262, with PV \$663
- Projected Annual Energy Cost Savings (compared to a home built to the 2006 IECC): without PV \$776, with PV \$1,366
- Builder's Added Cost Over 2006 IECC: without PV \$20,000, with PV \$37,660
- Annual Energy Savings: without PV 2,480 kWh, 614 Therms; with PV 9,032 kWh, 614 Therms

For Ray Pruban, co-owner of Amaris Homes in Maplewood, Minnesota, quality is key. It is one of the reasons he now builds homes to the U.S. Department of Energy's Zero Energy Ready Home program criteria.

"Customers understand I am not the least-cost-per-square-foot builder, but I aim to be the highest-quality-per-dollar builder," said Pruban.

Amaris Homes built the first home in Minnesota certified to the DOE Builders Challenge program, the precursor to the DOE Zero Energy Ready Home program. Pruban noted that, when he started building green homes in 2007, it was a tough sell but now more buyers are asking for it.

Pruban and his wife Linda founded Amaris Homes as a real estate development company in 2000. They have remained a small builder, building just a few homes a year so that they can personally focus on the quality they desire. Pruban got into home construction "through the back door." He had a successful computer hardware business that he sold at age 40. Rather than retiring, Pruban pursued a passion in real estate. "Other guys golf on weekends, I would sell real estate."

Running the real estate development company led to new home construction. "We would work with a builder to build a model home to get things going in a new development. I was always trying to get builders to build a better home, better looking, better performing, better quality. I got into house construction in 2007 just when things crashed, while everyone else was running away from it. It was a good time to start actually. I could learn with less pressure, while it wasn't so competitive. One of the hardest things about green homes is convincing the subs of the way things need to be done. That was a great time to get subs to do things the way you wanted them to because frankly they were all hungry for work."

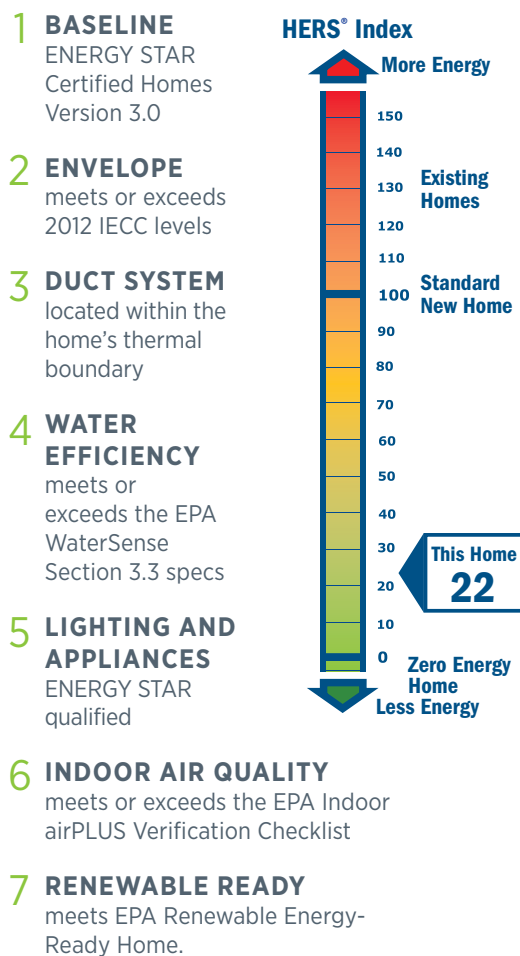


The U.S. Department of Energy invites home builders across the country to meet the extraordinary levels of excellence and quality specified in DOE's Zero Energy Ready Home program (formerly known as Challenge Home). Every DOE Zero Energy Ready Home starts with ENERGY STAR Certified Homes Version 3.0 for an energy-efficient home built on a solid foundation of building science research. Advanced technologies are designed in to give you superior construction, durability, and comfort; healthy indoor air; high-performance HVAC, lighting, and appliances; and solar-ready components for low or no utility bills in a quality home that will last for generations to come.

Low-flow fixtures and ENERGY STAR appliances reduce water and energy use in the kitchen of this custom home by Amaris Homes in Maplewood, Minnesota. Low- and no-VOC stains and finishes help to reduce indoor air pollutants in the tightly constructed home.



## What makes a home a DOE ZERO ENERGY READY HOME?



Pruban acknowledges the DOE Zero Energy Ready Home program requires all of the things that go into making a great high-performance home. The program requires homes to meet all of the requirements of ENERGY STAR Certified Homes Version 3.0 and the U.S. Environmental Protection Agency's Indoor airPLUS, as well as the hot water distribution requirements of the EPA's WaterSense program and the insulation requirements of the 2012 International Energy Conservation Code. Homes are also required to have a solar electric system installed or have the conduit and electrical panel space in place for it.

Pruban noted that, when he first started building to the EPA Indoor airPLUS specifications, he wasn't sure if the construction practices really were making a difference in terms of healthy indoor environments, but a few years of experience have convinced him. "I had one client who was a severe asthmatic, on an inhaler and several medications. Within 6 months of moving in, she was completely off her medications. I have multiple stories like that. To my clients, it makes a major difference," said Pruban. His own experience backs that up. "I've had postnasal drip my whole life. When I moved into my own home, that went away."

Amaris home buyers tend to be educated buyers who are looking for high efficiency and find Amaris through their website. "It's surprising how many of our buyers are doctors, lawyers, and engineers. If I took those three groups out of our customer base, I'd have no customers," said Pruban.

The owners of the award-winning home in Vadnais Heights chose Amaris because the wife has respiratory issues. In Minnesota, "99% of the builders line their walls with poly that is taped and glued, so a lot of homes in Minnesota have mold, either because they framed in wet wood or because water leaked in (and the walls can't dry out)," said Pruban. Pruban uses 2 inches of closed-cell spray foam to insulate, air seal, and provide a vapor retarder on the ceiling deck of the vented attic. This is covered with 15 inches of blown cellulose for a total ceiling insulation of R-65.5. Details like ice and water shield installed 36 inches in from the wall line, metal flashing at valleys and edges, step flashing and kick-out flashing at house-wall intersections, and continuous ridge vents help to keep the attics dry.

Pruban filled the wall cavities with 3 inches of closed-cell spray foam insulation, which serves as a vapor retarder. He also incorporated advanced framing techniques in the stud wall construction on the 1,882-ft<sup>2</sup> one-story home. The walls use 2x6 framing spaced at 24 inches on center and aligned with the roof



A fully modulating 95% efficient 110,000-Btu natural gas boiler provides hot water for domestic use and serves as the heat source for the home's radiant floor heating.

trusses with single-ply headers over windows. One inch of continuous rigid foam is installed over the studs for a total wall insulation value of R-24.5. The rigid foam is covered with 7/16 inch OSB, then house wrap. By installing the OSB over the rigid foam, Pruban noted he has a positive nailing surface for windows and cladding. Pruban had looked at coated OSB products that rely on tape for seam sealing but chose not to use it because of concerns about the factors that could affect the tape. "We are building in 20 degrees below and if guys drop the tape in the dirt, then stick it back on the house, how do you rely on that?" To make sure there is no thermal bridging between the house and the garage, Pruban had his framers frame the house and sheathe it with 1-inch-thick (R-5) sheets of rigid foam before framing the garage.

Pruban installed 2 inches (R-15) of rigid foam on the exterior of the foundation. Installing R-15 foam insulation on the exterior of the foundation will become a code requirement in the state of Minnesota effective January 2016. The state sent a code official to one of Pruban's job sites recently to see how he flashes the foam, which had been a challenge for builders. Pruban solved the problem by developing a technique that involved extending the above-grade sheathing over the foundation insulation.

The air sealing details Pruban employs provide an airtight draft-free home that achieved a blower door air leakage test result of 1.64 air changes per hour at 50 Pascals of pressure (ACH 50).

To complete the home's thermal envelope, Pruban selected high-performance, double-pane composite-framed windows with an argon gas filling between the panes for improved insulation and special clear low-emissivity coatings on the panes that minimize heat transfer.

A fully modulating 95% efficient, 110,000-Btu natural gas boiler serves the radiant in-floor heating system and also provides domestic hot water. An air-source heat pump with a variable-speed DC motor provides cooling at an efficiency of 14.5 SEER. All HVAC ductwork is rigid metal ducting that is mastic sealed and is located within the home's thermal enclosure. Duct leakage to the outside measured 18 cfm at 25 Pascals of pressure difference.

## HOME CERTIFICATIONS

DOE Zero Energy Ready Home Program, 100% commitment

ENERGY STAR Certified Homes Version 3.0

EPA Indoor airPLUS

Minnesota Green Path



Every DOE Zero Energy Ready Home combines a building science baseline specified by ENERGY STAR Certified Homes with advanced technologies and practices from DOE's Building America research program.





Three inches of closed-cell spray foam provide a low-permeable, air sealing and insulating layer in the wall cavities.

Ventilation to the tight home is provided by a heat recovery ventilator (HRV). The HRV provides balanced ventilation, bringing in and exhausting equal amounts of air. The two air streams cross in a heat exchanger that transfers heat from the warmer path to the cooler path to minimize heat losses in the winter and heat gains in the summer. The air passes through a high-filtration MERV 16 filter. In addition, exhaust fans in the bathrooms are controlled by motion detectors to remove moisture from showers and baths.

All of the home's lighting is ultra-efficient LED based and all fixtures are ENERGY STAR rated. The home's refrigerator, dishwasher, and three exhaust fans are also ENERGY STAR-labeled.

These energy-efficiency features together are expected to provide the home owners with \$776 in annual energy savings compared to a similar house built to the 2006 International Energy Conservation Code (IECC). When the 4.9 kW of photovoltaic solar electric roof-mounted panels are included, savings jump to an expected \$1,366 annually.

All of the plumbing fixtures in the home are low-flow models. The bathroom faucets are all certified to the water-saving requirements of the EPA's WaterSense program. The home also meets the EPA's Indoor airPLUS requirements, which promote healthier indoor air. All of the paints, coatings, primers, wood finishes, adhesives, and glues used in the home are low- or no-VOC products.

A FEMA-rated storm shelter was installed behind the garage. The storm-resistant home is constructed to exceed code-specified wind ratings. The exterior walls and roof are tied to the poured concrete wall foundation with specially designed metal strapping. The exterior walls' 3 inches of closed-cell insulation is shown to provide at least 200% additional sheer (lateral) strength. Upgraded hold-downs and reinforced garage doors were also installed.

The barrier-free front entry and oversized interior doors accommodate wheel chair access and the master shower offers zero-barrier walk-in access for age-in-place possibilities.

Pruban has committed to building 100% of his homes to the requirements of DOE's Zero Energy Ready Home program. He has embedded high-performance principles into Amaris Homes' everyday building practices. Amaris works closely with their trade partners to convey detailed project specifications, and each project begins with a mandatory pre-construction meeting with trade and site supervisors to review the plans, specifications, and schedule. In addition, every home receives third-party quality assurance verifications and performance testing.

*Photos courtesy of Amaris Homes*

## KEY FEATURES

- **DOE Zero Energy Ready Home Path:** Performance.
- **Walls:** 2x4; 24" on center aligned with roof trusses; 1" rigid foam exterior insulation; 3" closed-cell spray foam in cavity (R-24); house wrap; engineered wood siding.
- **Roof:** Ice and water shield 36" past wall line; valley metal flashing; metal roof edging; step flashing at house and wall connections; kick-out flashing; continuous ridge vents; 15# felt; architectural asphalt shingles.
- **Attic:** 16" energy heel trusses; 2" closed-cell spray foam on attic floor; 15" blown-in cellulose (R-65.5).
- **Foundation:** Slab on grade; 2" rigid foam insulation at foundation walls and below slab (R-10).
- **Windows:** Double-pane; argon-filled; PVC framed; low-e; U=0.25; SHGC=0.16.
- **Air Sealing:** 1.64 ACH 50.
- **Ventilation:** HRV; motion detector-controlled exhaust fans; 70 watts; 75 cfm; MERV 16 filter.
- **HVAC:** Air-source heat pump with variable speed; rigid metal HVAC ducts in conditioned space; 14.5 SEER.
- **Hot Water:** Natural gas boiler for radiant floor heat and domestic hot water; 95% efficient.
- **Lighting:** 100% LED ENERGY STAR.
- **Appliances:** ENERGY STAR-rated refrigerator, dishwasher, and three exhaust fans.
- **Solar:** 4.9 kW PV.
- **Water Conservation:** Low-flow faucets, showerheads, and toilets.
- **Other:** Energy management system; programmable thermostat, low-VOC.