

# High Performance Homes

Garrison Falls  
Gettysburg, PA



## BUILDER PROFILE

High Performance Homes, Gettysburg, PA  
Kiere DeGrandchamp and Amy Whaley  
awhaley@hphpa.com  
717-359-4663, www.hphpa.com  
Rater: Building Performance Solutions  
John Hensley  
john@bpsconsultant.com

## FEATURED HOME/DEVELOPMENT:

### Project Data:

- Name: Garrison Falls
- Location: Gettysburg, PA
- Layout: 3 bdrm, 3 bath, 1 fl +bsmt, 5,140 ft<sup>2</sup>
- Climate Zone: IECC 5A, cold
- Completion: March 2015
- Category: custom for buyer

### Modeled Performance Data:

- HERS Index: without PV 32, with PV 14
- Projected Annual Energy Costs: without PV \$2,002, with PV \$699
- Projected Annual Energy Cost Savings (vs home built to 2009 IECC): without PV \$842, with PV \$2,145
- Projected Annual Energy Savings: 227.7 MMBtu, with PV 360.7 MMBtu
- Added Construction Cost: without PV \$32,500, with PV \$45,500

Kiere DeGrandchamp launched High-Performance Homes in Gettysburg, Pennsylvania, in 2014, with the goal of doing his part to “change the world” with responsible building. When he learned about the U.S. Department of Energy’s Zero Energy Ready Home program in 2015 he signed on with a 100% commitment to build all of his luxury custom and production homes to the program’s specifications. “The DOE ZERH program encapsulates everything we hope to achieve a quality built home that is livable, efficient, healthy, and environmentally friendly,” said DeGrandchamp, who is head of building and construction.

The builder has certified three homes so far and has three more pending certification, with a potential build out of 250 more at the Links at Gettysburg golf course community where he is constructing.

High Performance Homes won a 2016 Housing Innovation Award from the DOE for a 5,140-ft<sup>2</sup> home built at the Links in Gettysburg. They also won an award in 2015 for a home at the same Links neighborhood.

DeGrandchamp has gone above and beyond to market the benefits of DOE Zero Energy Ready homes to potential buyers and to other builders, realtors, and appraisers. His efforts have paid off. “We have a strong pipeline of pending contracts who are hoping to start building in the next six months to two years,” said DeGrandchamp. His market is primarily empty nesters and couples ready to retire from the DC area.

The DOE Zero Energy Ready Home program requires homes to meet the requirements of ENERGY STAR Certified Homes Version 3.0 and the U.S. Environmental Protection Agency’s Indoor airPLUS program 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.



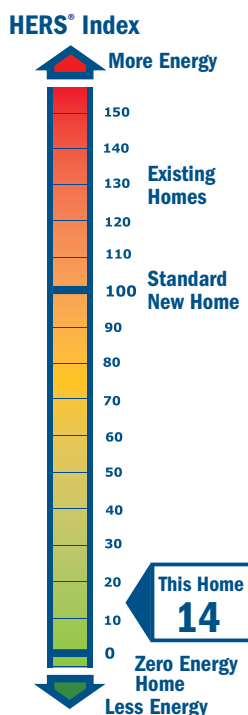
The U.S. Department of Energy invites home builders across the country to meet the extraordinary levels of excellence and quality specified in DOE’s Zero Energy Ready Home program (formerly known as Challenge Home). Every DOE Zero Energy Ready Home starts with ENERGY STAR Certified Homes Version 3.0 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.

High Performance Homes built this 5,140-ft<sup>2</sup> home in Gettysburg, Pennsylvania, to the performance criteria of the DOE Zero Energy Ready Home (ZERH) program. The hip roof adds hurricane resistance. For the 7-kW PV array, the builder selected PV shingles rather than panels. The shingles integrate with the ENERGY STAR-rated asphalt roof shingles for a very low profile. Under the shingles the decking is protected with 15# felt ice and water shield at valleys, eaves, and gable edges. Kick-out flashing and 5-inch sidewall flashing protect walls. All of the downspouts are connected to pipe to carry runoff 10 feet away from the foundation with pop-ups for over-flow.



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

- 1 **BASELINE**  
ENERGY STAR Certified Homes Version 3.0
- 2 **ENVELOPE**  
meets or exceeds 2012 IECC levels
- 3 **DUCT SYSTEM**  
located within the home's thermal boundary
- 4 **WATER EFFICIENCY**  
meets or exceeds the EPA WaterSense Section 3.3 specs
- 5 **LIGHTING AND APPLIANCES**  
ENERGY STAR qualified
- 6 **INDOOR AIR QUALITY**  
meets or exceeds the EPA Indoor airPLUS Verification Checklist
- 7 **RENEWABLE READY**  
meets EPA Renewable Energy-Ready Home.



In addition, homes are required to have solar electric panels installed or have the conduit and electrical panel space in place for future installation.

The 2016 award-winning home is a one-story home with a walk-out basement. High Performance Homes constructed the standard basement with a poured-in-place concrete foundation. Under the entire slab they installed a 2-inch layer of rigid extruded polystyrene (XPS) foam for an R-10 value. The below-grade basement walls are poured concrete walls insulated on the inside with 0.5 inches of expanded polystyrene (EPS) rigid foam. To the inside of the rigid foam, the builder set up advanced framed walls with wood studs set 24 inches on center and ladder blocking at all interior-exterior wall intersections. The wall cavities were filled with R-15 fiberglass batts. The above-grade walk-out basement walls are 10.25-inch structural insulated panels (SIPs) that provide an R-37 insulation value.

The above-grade walls were made of R-23 6.5-inch SIPs. SIPs are made of two sheets of OSB that sandwich a layer of rigid foam. The wall panels are produced in a factory and come to the job site cut to fit with window and door cutouts already in place for quick assembly. The fully adhered precision-cut panels produce a straight, sturdy structure that provides consistent thermal protection with few opportunities for thermal bridging or air leakage.

The band joists consisted of 4.5-inch SIPs and were further insulated with 1 inch of closed-cell foam that both sealed and insulated the seams at this important juncture. On the exterior of the walls, the SIPs were covered with house wrap, and stone or stucco siding. Every crack and joint was sealed using low-expansion foam and caulk (where applicable). On the exterior walls that would have stone veneer, the SIPs were covered with house wrap and a vertical scratch coat over tar paper and diamond lath which provided the drainage plane. Where EIFS are used, they installed stucco wrap under a 2-inch EPS foam. At the wood-to-foundation transition they installed a weep screed for proper drainage. The entire wall assembly should net an R-value close to 30.

The vented attic was insulated and air sealed along the entire ceiling deck with 1 inch of closed-cell spray foam then R-49 blown cellulose for a total insulation value of R-53-56. The attic has full ridge and soffit vents.

The tight home was tested per DOE Zero Energy Ready Home requirements and showed air leakage of only 1.1 air changes per hour at 50 Pascals. To provide



A geothermal heat pump cuts heating and cooling costs. High-efficiency LED and CFL lighting, ENERGY STAR appliances and bath fans, and high-performance double-pane windows with low-emissivity coatings add to energy savings. The home meets all of the EPA's Indoor airPLUS requirements including use of no- and low-VOC finishes and flooring.

good ventilation for the home, an energy recovery ventilator (ERV) was installed. The ERV's fresh air intake is ducted to the return side of the central air handler.

The home is heated and cooled with an ultra-efficient geothermal heat pump. The geothermal heat pump uses a vertical well installed 640 ft deep in the backyard to draw heat from the ground in the winter and shed heat to the ground in the summer. The heat pump has a heating efficiency of 5.6 COP and a cooling efficiency of 20.3 EER. All of the ducts are located in conditioned space.

The geothermal heat pump also helps to provide domestic hot water with a desuperheater that preheats water for a 50-gallon 93-EF electric tank heater. A motion-sensor-activated hot water recirculation pump and low-flow fixtures help to reduce hot water usage.

The highly efficient home achieves a Home Energy Rating System (HERS) score of 32, far below the 80 to 100 HERS of typical code construction. With the addition of a 7.2-kW solar system, the HERS score drops to 14 and annual energy bills drop from \$2,002 per year to \$700 per year or \$58 per month.

Even with the exceptional performance, DeGrandchamp knows marketing is important and because his goal is to not only build good houses himself but to help move the industry forward, DeGrandchamp has pushed to make the most of every opportunity to promote the virtues of DOE Zero Energy Ready Homes.

“We have utilized virtually every available marketing and sales solutions available in today's modern marketing and sales toolbox to communicate the advantages our Zero Energy Ready Homes deliver to home buyers,” said DeGrandchamp. In partnership with DOE, DeGrandchamp developed a seminar series called “Helping the Consumer Understand the Value, Technology, and Benefits of High Performance Homes.” DeGrandchamp collaborated with the local realtor's association and the Real Estate Commission of Pennsylvania to get the course offered to realtors and appraisers for 3.5 credit hours of continuing education and co-taught the course with Sam Rashkin and James Lyons of DOE's Zero Energy Ready Home Program. He also teamed up with Rashkin and Lyons to teach a 5-credit course on Zero Energy Ready Homes through the American Institute of Architects. “We received feedback from many that they would like to attend future courses,” said DeGrandchamp. Both courses were held at a model home at the Links. High Performance Homes offers guided “technology tours” of its two model homes at the Links; one home has cut-aways showing construction

## HOME CERTIFICATIONS

DOE Zero Energy Ready Home Program, 100% commitment

ENERGY STAR Certified Homes Version 3.0

EPA Indoor airPLUS

NAHB National Green Building Standard



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.



Solar PV shingles integrate seamlessly with the roofing shingles.

details, the other is decorated and has signage emphasizing energy cost savings, health, and comfort benefits.

A majority of the builder's marketing funds are spent on generating traffic to the High Performance Homes website. The website highlights their DOE relationship with a DOE ZERH customized brochure and fact sheet, certification page for homes, links to the DOE ZERH webpages, and a video of DOE Chief Architect Sam Rashkin's presentation on ZERH.

High Performance Homes uses social media including Facebook, Twitter, and LinkedIn to highlight achievements, certifications, awards, and feature articles to a following of 2,300 people. "Social media outlets also let us display reinforcement pieces like "SIPs Construction vs Traditional Construction" and home owner energy bills as they become available," said DeGrandchamp. High Performance Homes has a newsletter with 300 subscribers. DeGrandchamp credits paid Facebook ads featuring ZERH practices with helping their following to skyrocket over the past year. He said paid online advertising efforts, such as Google AdWords generated a triple-fold increase of traffic to their website. The builder also asks for testimonials from every home buyer. These are posted on their website.

Press releases have been especially effective. One led to a feature story in the *Washington Post* that was picked up by 118 media outlets and was republished on the front page of the real estate section in the *Chicago-Tribune*, leading to several calls and emails from buyers. Stories about the builder have appeared in the *Washington Post*, *Baltimore Magazine*, *What's Up? Magazine*, the *Capital Gazette Newspaper*, *Hagerstown Magazine*, *Reuters*, *Builder Magazine*, *Solar Power World*, *Electronic House*, *Builder and Developer Magazine* and dozens more. DeGrandchamp put the value of this free publicity at \$396,000 with a reach of 150 million or more.

"Our goal is to deliver exceptional quality homes and high client satisfaction, not volume. We believe investing in quality, customer service, and innovation is what a leader in the housing industry should do," said DeGrandchamp. Home buyers are taking the message to heart. As one stated "these are not people just doing a job, these are people who are passionate about a craft. They're not just building a house, they're building a home."

*Photos courtesy of High Performance Homes*

## KEY FEATURES

- **DOE Zero Energy Ready Home Path:** Performance.
- **Walls:** R-23 6.5" SIPs above grade, 4.5" SIP at band joist plus 1" closed-cell foam; R-19 batt in floor joists; house wrap, stone or stucco siding.
- **Roof:** Composite shingle over 15# felt, ice-and-water shield in valleys and at eaves, kick-out and 5" sidewall flashing; all down spouts drain to 10' pipe with pop-ups.
- **Attic:** R-53 vented attic with 1" closed-cell spray foam + R-49 blown cellulose.
- **Foundation:** Basement with 2" R-10 XPS under slab, poured concrete walls insulated on inside with 0.5" EPS and advanced framed with R-15 batts. Walk-out basement walls are 10.25" R-37 SIPs.
- **Windows:** Double-pane low-e, argon filled, U=0.25, SHGC=0.29.
- **Air Sealing:** 1.1 ACH 50.
- **Ventilation:** ERV.
- **HVAC:** Geothermal heat pump, 5.6 COP, 20.3 EER; all ducts in conditioned space.
- **Hot Water:** 50-gal desuperheater on geo heat pump + 93 EF 50-gal electric water heater.
- **Lighting:** 50% LED, 50% CFL.
- **Appliances:** ENERGY STAR dishwasher, refrigerator, and bath fans.
- **Solar:** 7.2-kW PV shingles.
- **Water Conservation:** Motion-sensor hot water recirc pump, low-flow fixtures.
- **Energy Management System:** Internet energy monitoring of HVAC and solar.
- **Other:** No-/low-VOC paint, adhesives, cabinetry.