



# Insight Homes

Peterman II  
Lewes, DE



## BUILDER PROFILE

Insight Homes  
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## FEATURED HOME/DEVELOPMENT:

### Project Data:

- Name: The Peterman II
- Location: Lewes, Delaware
- Layout: 5 bdrm, 4 bath, 2 fl + bsmt, 5,845 ft<sup>2</sup>
- Climate: IECC 4A, mixed-humid
- Completed: March 2022
- Category: Production

### Modeled Performance Data:

- HERS INDEX: without PV: 46
- Annual Energy Costs: without PV: \$3,160
- Annual Energy Cost Savings: without PV: \$4,539
- Annual Energy Savings: without PV: 10,228 kWh
- Savings in the First 30 Years: without PV: \$221,269

Not many builders are confident enough in the energy efficiency of their homes to post their homeowners' utility bills on their website, but Insight Homes of Bridgeville, Delaware, has made a habit of it.

In 2022 Insight Homes garnered its third Housing Innovation Grand Award from the U.S. Department of Energy for constructing the most homes in a year certified to DOE's Zero Energy Ready Home criteria. The production home builder constructs about 200 homes a year and is committed to building all of its homes to the requirements of DOE's Zero Energy Ready Home program. It has certified about 800 homes to the program so far.

"We ask homeowners to share their utility bills with us as testimonials to the actual performance observed in their homes. The utility bills are posted on Insight Home's website for prospective buyers to review," said Kevin Brozyna, Vice President of Operations. "Insight started building new homes in southern Delaware with the vision of making a better product and we've spent years perfecting the process. Today, our homes are the healthiest and most energy-efficient homes in the Mid-Atlantic."

Building to the requirements of the DOE program has helped Insight to meet its energy efficiency goals. Every DOE Zero Energy Ready certified home meets the requirements of ENERGY STAR Certified Homes. They must also be certified to the U.S. Environmental Protection Agency's Indoor airPLUS criteria and meet the hot water distribution requirements of the EPA's WaterSense program. DOE Zero Energy Ready homes must also meet IECC 2015 insulation requirements, be blower door tested for whole house air leakage, comply with moisture management guidelines, have ducts inside conditioned space, and use ENERGY STAR-labeled windows, lighting, and appliances. Homes must also have solar electric panels installed or have the conduit and electrical panel space in place for future installation of solar panels.



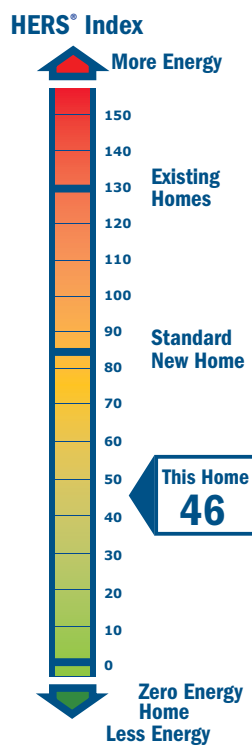
The U.S. Department of Energy invites home builders across the country to meet the extraordinary levels of excellence and quality specified in DOE's Zero Energy Ready Home program. Every DOE Zero Energy Ready Home starts with ENERGY STAR Certified Homes Version 3.0/3.1/3.2 for an energy-efficient home 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.

Buyers of this Insight home will save over \$4,500 in energy costs per year compared to a similar sized home built to code. The home was built to meet the insulation and air sealing requirements of the DOE Zero Energy Ready Home program and has highly efficient HVAC, water heating, lighting, windows, and appliances.



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

- 1 **BASELINE ENERGY STAR Certified Homes Version 3.0/3.1**
- 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.



Insight also received a Housing Innovation Award for its Peterman II home model in the production home category. The home is zero energy ready with conduit in place for future installation of the solar panels. Even without the PV, homeowners who purchase Insight's Peterman II model can expect energy cost savings of more than \$4,500 per year, or more than \$220,000 in the first 30 years, compared to a home just built to code.

Insight Homes utilizes an integrated design process when developing the plans for a new house model. Through this process, the designers meet with key trade partners including the HVAC, structural, framing, and plumbing trades to get input to ensure high performance targets can be met in a functional and buildable design.

Insight Homes employs a panelized wall system consisting of 2x6 framing at 24-inch on-center stud spacing and other advanced framing techniques to reduce wood and increase insulation in the walls such as insulated headers, reduced framing around windows, and two- and three-stud corners with studs positioned to allow insulation into the corners. Every panel is made in a climate-controlled indoor environment where materials are protected from the elements as they are precision cut and attached with laser-guided pneumatic nailers and self-squaring roller tables so every panel is constructed with an accuracy within 1/16<sup>th</sup> of an inch. The wall panels have a 7/16-inch coated OSB exterior sheathing. This product saves time and money by serving as the structural sheathing and the primary weather barrier when all seams between panels are taped. The wall cavities are insulated with R-23 of netted and blown fiberglass. No plumbing or HVAC is installed in the exterior walls. The walls are clad with vinyl siding.

The home also has a finished basement. The poured concrete walls are protected on the exterior with a liquid-applied water proofing and dimple board drainage membrane that extends from grade down to the footing drain. An interior perimeter drain is installed and connected to a sump pit. The foundation slab sits on 4 inches of clean gravel for a capillary break and is wrapped in a polyethylene vapor barrier. In the finished areas of the basement, the walls are insulated with R-15 spray-polyurethane foam applied to the inside of the foundation walls within the frame stud bays. In the unfinished areas of the basement, 2 inches (R-10) of foil-faced polyisocyanurate rigid insulation is applied to the face of the poured concrete wall. The band joists are insulated with R-19 of open-cell spray polyurethane foam.

The vented attic is constructed with engineered roof trusses that include an 18-inch raised heel design to allow for full depth insulation over the top plates of the exterior





Insight Homes uses the garages of its model homes as building science demonstration centers, with mock-ups of building sections, behind-the-walls displays, posters, and videos to explain the high-performance home features that make the homes healthy, energy efficient, and durable. Insight uses only in-house sales staff that are specifically trained in the health, comfort, and efficiency benefits and features of a high-performance home.

walls. Insulation baffles are installed in each attic bay to prevent wind washing from the soffit vents and to provide a path for attic ventilation air to flow from the eaves up to the ridge vent. In the mixed humid climate, this air flow helps to pull heat and humidity out of the attic in the summer and to prevent ice dams in the winter. The attic is insulated with 16.25 inches of loose blown fiberglass insulation to achieve an R-49 insulation value across the full ceiling plane. For any vaulted ceiling areas, R-38 fiberglass batts were used. Attic hatches that are located in the side walls or the ceiling plane are insulated with multiple layers of extruded polystyrene rigid foam board and are gasketed for air sealing. No mechanical equipment or HVAC ductwork is permitted in the attic. All top plates along interior walls are sealed with canned foam, as are any penetrations for light fixtures, exhaust fans, plumbing stacks, etc., through the ceiling plane.

Every home certified through the DOE Zero Energy Ready Home program is inspected by a HERS rater and tested for air tightness. This Insight home achieved an air tightness of 1.9 air changes per hour at 50 Pascals (ACH50). Air sealing occurred in two stages. The first stage occurred before drywall was installed and after mechanical rough-in when all penetrations through the subfloor to the crawlspace, through the top plates and chases to the attic, and through the exterior walls were sealed using expanding foam sealant and rough openings around the windows and door frames were sealed with low-expansion foam sealant. The second stage occurred after drywall was installed when spray foam was used to seal the back side of the ceiling drywall, along the top plates of all interior partition walls, and any penetrations through the ceiling drywall and partition walls (for light fixtures, exhaust fans, plumbing stacks, etc.).

The home is heated and cooled with a dual-fuel system including a central air source heat pump with a variable speed compressor and a propane furnace. The heat pump has a heating efficiency of 10.0 HSPF and a cooling efficiency of 20.0 SEER. The modulating gas (propane) furnace has a heating efficiency of 97.5 AFUE. The indoor equipment is located in a conditioned control room in the basement. The duct system trunk lines are rigid, round sheet metal ducts while branch takeoffs are insulated flex ducts with a manual balancing damper at each branch. The MERV 13 air filter is located in a central return box placed in a wall of the living space to provide easy access for replacement. By locating the return register vertically in the wall, the accumulation of dust and debris that can occur with a floor register is avoided. All systems are equipped with a wifi-enabled thermostat. Ventilation is provided by exhaust fans located in the bathrooms.

## HOME CERTIFICATIONS

DOE Zero Energy Ready Home Quality Management Guidelines

DOE Zero Energy Ready Home Program - 100% Commitment

ENERGY STAR Certified Homes Version 3.1

EPA Indoor airPLUS

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.



Advanced framing allows more room for blown fiberglass insulation in the 2x6 at 24-inch on-center framed walls.

Given the longer shoulder seasons in the mixed-humid climate, space conditioning demands for sensible load may be minimal. Coupled with the high-performance windows, 6-inch exterior walls, and larger overhangs, the heating and cooling load is significantly reduced for a home of this size. With the space conditioning system not calling for heating or cooling, the homes are designed to have the central air handler fan (with an ECM motor) run in manual mode at 30% fan capacity for a minimum of 45 minutes every hour. Ceiling fans are installed in the central living spaces, including the living room, loft, morning room, and master bedroom. The periodic cycling of

the air handler, coupled with the standard ceiling fans, can help to ensure mixing of the air throughout the home and prevent stratification from occurring when there is no demand for heating and cooling.

All of the home's lighting fixtures use LED light sources. The home's refrigerator, dishwasher, and tankless water heater are all ENERGY STAR rated. The home's plumbing system consists of a central manifold with PEX piping. The homerun distribution system supply lines are sized for each specific end use and shut-off valves are installed at each point of use. The fixtures are EPA WaterSense-labeled.

All homes certified through the DOE Zero Energy Ready Home program must meet the requirements of EPA Indoor airPLUS. Insight Homes uses low-VOC paints, construction adhesives, carpeting, and other materials that allow the home to achieve the gold level of certification under the National Green Building Standard.

In addition to meeting the DOE Zero Energy Ready Home designation, which includes ENERGY STAR and Indoor airPLUS certification, Insight Homes has also committed to building all its homes to be certified to the National Green Building Standard. These performance programs require third-party inspections, as well as performance testing at several stages of construction to ensure compliance with strict guidelines. In addition, Insight Homes' HVAC suppliers require system commissioning and air flow testing prior to occupancy.

"Insight's entire business model evolved around home performance, efficiency, and a healthy indoor environment," said Brozyna. "Because we made the decision to make these high-performance features standard on all the homes we build, we are able to negotiate better pricing from vendors on higher performing products. Savings are achieved by placing large-volume orders rather than purchasing them as individual upgrades. This allows Insight to incorporate better equipment in all our homes more cost effectively. Insight Homes was started with the vision to be better and do better for home buyers. When our customers are still amazed, 5 years after moving in, at how low their energy bills are, we know we are living up to our motto – 'It's just a better house.'"

## KEY FEATURES

- **Walls:** Panelized, 2x6 at 24" o.c., R-23 total: advanced-framed, R-23 netted blown fiberglass, 7/16" coated OSB taped, vinyl siding. No plumbing or HVAC in exterior walls.
- **Roof:** Truss gabled roof: 7/16" OSB sheathing, 15# felt, self-adhered membrane in valleys; composite shingles, doubled at rakes; ridge and soffit vents; 15" overhangs.
- **Attic:** Vented attic: R-49 total: 16.25" blown fiberglass, R-38 fiberglass batts in vaulted ceilings. Attic hatches gasketed and insulated with XPS.
- **Foundation:** Finished basement: Poured concrete walls with R-15 SPF in finished areas and R-10 poly-iso in unfinished areas, R-19 open-cell in band joist. Underslab 4" gravel with vapor barrier, perimeter drainage tile and sump pump.
- **Windows:** Double-pane, argon-filled, vinyl frame, double-hung, U=0.28, SHGC=0.19.
- **Air Sealing:** 1.9 ACH50. Canned foam seal all top plates and holes in walls, attic, subfloor.
- **Ventilation:** Exhaust-only ventilation, MERV 13 filters.
- **HVAC:** Gas furnace, 97.5 AFUE. Central air-source heat pump, 10 HSPF, 20 SEER.
- **Hot Water:** Propane condensing tankless water heater, 0.97 EF.
- **Lighting:** 100% LED.
- **Appliances:** ENERGY STAR refrigerator, dishwasher, and water heater.
- **Solar:** No PV.
- **Water Conservation:** EPA WaterSense fixtures, Central manifold with PEX piping and homerun distribution.
- **Energy Management System:** Wi-Fi-enabled thermostat.
- **Other:** National Green Building Standard Gold level home. Panelized wall construction.

*Photos courtesy of Insight Homes*