

# Addison Homes

The Emery  
Greenville, SC



## BUILDER PROFILE

Addison Homes, Greer, SC  
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864-848-2667, www.addison-homes.com  
Rater: Wood Insulating  
Dodd Wood, dodd@woodinsulating.com

## FEATURED HOME/DEVELOPMENT:

### Project Data:

- Name: The Emery
- Location: Greenville, SC
- Layout: 3 bdrm, 2 bath, 1 fl + bsmt, 4,551 ft<sup>2</sup>
- Climate Zone: IECC 3A, mixed-humid
- Completion: September 2015
- Category: custom for buyer

### Modeled Performance Data:

- HERS Index: without PV 43, with PV 21
- Projected Annual Energy Costs: without PV \$1,828, with PV \$855
- Projected Annual Energy Cost Savings (vs home built to 2009 IECC): without PV \$1,439, with PV \$2,412
- Projected Annual Energy Savings: without PV 13,830 kWh, 81 therms, with PV 23,555 kWh, 81 therms
- Added Construction Cost: without PV \$500, with PV \$38,000

“Minimizing environmental impact while maximizing home owner value” is one way Addison Homes sums up its construction philosophy. That attitude underscores construction practices at the builder’s Trailside Community in Greenville, South Carolina, where this home won a 2016 Housing Innovation Award from the U.S. Department of Energy.

The award-winning home also earned a DOE Zero Energy Ready Home program label, which includes certification to ENERGY STAR Certified Homes Version 3.0 and the U.S. Environmental Protection Agency’s Indoor airPLUS program. The DOE program also requires that homes meet the hot water distribution requirements of the EPA’s WaterSense program and the insulation requirements of the 2012 International Energy Conservation Code, and have electrical panel space in place for future photovoltaic panel installation. Addison Homes went beyond these requirements to meet the optional certifications of EPA WaterSense for all of the home’s plumbing and irrigation and DOE’s Zero Energy Ready Home Quality Management Guidelines, as well as certification to ENERGY STAR Version 3.1. Addison also installed solar photovoltaic shingles that generate more energy than the home uses annually. The home has also achieved an Active House certification (an international label focused on comfort, daylighting, air quality, energy efficiency, and low impact on the environment).

Winning awards is nothing new for Addison Homes and its forward-thinking team. The builder has won several awards, including a 2016 Pinnacle Award from the Home Builders Association of South Carolina, the U.S. Green Building Council-South Carolina Chapter’s Leadership in Green Building Award, the National Association of Home Builders’ Green Advocacy Award, EarthCraft House Regional Builder of the Year, the Greenville Home Builders Association Builder of the Year, the EarthCraft House Gold Project of the Year, and the Southern Home & Garden Bridge Award for Green Building.



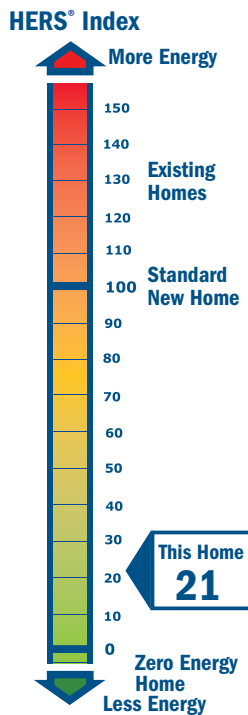
The U.S. Department of Energy invites home builders across the country to meet the extraordinary levels of excellence and quality specified in DOE’s Zero Energy Ready Home program (formerly known as Challenge Home). Every DOE Zero Energy Ready Home starts with ENERGY STAR Certified Homes Version 3.0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

Addison Homes built this 4,551-ft<sup>2</sup> home in Greenville, South Carolina, to the performance criteria of the DOE Zero Energy Ready Home (ZERH) program. Zero- and low-VOC paints, hardwood flooring, carpets, adhesives, and cabinets help the home meet EPA Indoor airPLUS criteria. The home is equipped with a high-efficiency ENERGY STAR-rated refrigerator and dishwasher for energy and water savings.



### 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.



Addison Homes founder Todd Usher was the first builder in the United States to earn the National Association of Home Builders' Master Certified Green Professional designation. Usher has held a variety of industry credentials including EarthCraft House™ Technical Advisor, ENERGY STAR® home energy rater, LEED® Accredited Professional, LEED for Homes® Green Rater, National Green Building Program™ Accredited Verifier for the NAHB Research Center, Certified Aging in Place Specialist, Graduate Master Builder, and South Carolina Certified Master Builder. Usher served as President of the Home Builders Association of Greenville in 2008 and is now an NAHB National Director and South Carolina HBA Education Chairman.

This is Addison Homes' third home to receive a DOE Housing Innovation Award. Addison has committed to building all of its future homes to the DOE Zero Energy Ready Home program. "The U.S. Department of Energy has set a standard that is truly 'best in class' and is pulling our industry towards a quality revolution," said Usher.

The award-winning home was one of 16 homes to be built by Addison Homes at its Trailside community, adjacent to the Greenville Health System Swamp Rabbit Trail, a popular walking and biking "rails to trails" project. While the location is drawing visitors, the high-performance features of these homes are getting buyers.

Addison Homes constructed the 4,551-ft<sup>2</sup> home as a one-floor plus walk-out basement home with wood-framed walls consisting of 2x4s set 16 inches on center with insulated headers and two-stud (rather than three- or four-stud) corners. A variety of insulation and sealants wrap the home in a blanket of efficiency. The wall cavities were filled with R-13 unfaced fiberglass batt insulation and sheathed with OSB, then covered with 1-inch-thick (R-5) sheets of rigid foam insulation providing a continuous thermal break to stop heat from transferring through the walls at the studs, resulting in a wall with a total insulation value of R-18. All of the seams in the rigid foam were taped so the rigid foam can serve as an air barrier and drainage plane behind the vinyl siding. Flashing tape seals the seams around windows and doors to keep out moisture and air.

The vented attic was insulated with R-38 blown fiberglass. All penetrations and top plates were sealed. Skylight shafts were insulated on the attic side with R-10 rigid foam and R-19 unfaced fiberglass batts. The roof decking was covered with synthetic felt. Extra care was taken to prevent leaks with drip-edge flashing, vent gaskets on all vents, butyl tape at all penetrations, and ice-and-water shield in





The home's basement walls are constructed of pre-cast concrete panels. The moisture-resistant walls have a continuous thermal barrier consisting of integrated rigid foam that covers the inside surface of the concrete panels and wraps around the concrete studs, behind the metal nailer facing, to stop heat transfer through the walls.

valleys and low roofs under the asphalt and PV shingles. Kick-out flashing helps to protect side walls from water entry.

The daylight basement was constructed of pre-cast concrete walls insulated along the exterior with continuous rigid foam insulation resulting in an R-value of R-16. R-5 rigid foam was installed under the slab at the perimeter. The daylight wall of the basement has R-5 rigid foam over the OSB sheathing.

The home was tested per DOE Zero Energy Ready Home requirements and showed air leakage of only 1.4 air changes per hour at 50 Pascals. That's more than twice as tight as required by the newest energy code. (The 2015 International Energy Conservation Code requires 3 ACH 50 or less.)

To maintain proper indoor air quality, a fresh air system was incorporated into the HVAC system including a MERV 16 filter and ventilation controller.

The home is equipped with a highly efficient central heat pump with a cooling efficiency of 20.5 SEER and a heating efficiency of 10.2 HSPF. The system maintains precise temperature and humidity throughout the house, as its variable capacity compressor automatically adjusts up or down as necessary, using only the amount of energy needed to meet the thermostat set point. Return registers are located in every room and balancing dampers are installed on every supply run. The ductwork consists of insulated and air-sealed rigid trunk and flexible branch ducts. All ductwork was installed in the conditioned basement and sealed per ENERGY STAR and DOE Zero Energy Ready Home requirements for improved performance.

All of the home's windows are double pane with low-emissivity coatings that reduce heat transfer. These windows, together with sun tunnels and solar venting skylights, provide daylight to nearly every room in the house. Nearly all of the home's light fixtures are equipped with LED lighting.

An ENERGY STAR-labeled tankless condensing gas water heater with a 0.95 energy factor provides efficient water heating with low NOx emissions. The home is piped with an insulated hot water recirculation loop that distributes hot water close to each hot water fixture in the home. The water heater includes a smart logic controller that "learns" the occupants' hot water usage patterns and circulates hot water through the insulated loop during times when the residents are most likely to use it. This eliminates the wait time for hot water at

## HOME CERTIFICATIONS

DOE Zero Energy Ready Home Program, 100% commitment

ENERGY STAR Certified Homes Version 3.1

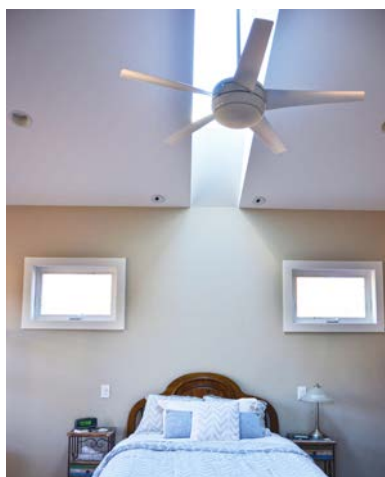
EPA Indoor airPLUS

EPA WaterSense

Active House USA



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.



The home is flooded with natural daylight through skylights, sun tubes, and roof windows.

paints and finishes; no-added-formaldehyde insulation; GREENGUARD-certified hardwood flooring, carpet, and carpet pad; non-toxic termite treatment; and good moisture management details.

Elements of universal design were incorporated throughout the home, including wide doorways, a zero step garage entry, and a curbless shower in the master bath. Addison also implemented good stewardship practices including installing cabinetry labeled through the Kitchen Cabinet Manufacturer's Association's (KCMA) Environmental Stewardship Program (ESP). Laminated engineered beams, I-joint floors, engineered roof trusses, and finger-jointed trim were used because these reduce the use of large-dimensional lumber.

“We leave nothing to happenstance. When it comes to quality we want every T crossed, every I dotted, so our Quality Management System puts all requirements and expectations in writing to ensure each phase of the home building process is completed according to our established standards. Trade partner general agreements define our expectations for every business relationship. By clearly outlining obligations, these agreements help to eliminate the errors that can result from miscommunication. Our job ready checklists, scopes of work, and quality checklists encourage best practices by our trade partners, not only standardizing work requirements but also outlining job specifications, minimizing resources wasted on rework. Our project superintendents execute the job ready checklists in advance of specific construction activities to properly prepare for the next trade partner or phase and review the quality checklists as work is completed, either approving the job for prompt payment or referring back to the vendor or trade partner for correction.”

“Our strategy for addressing performance is to adhere to nationally recognized standards and best practices based on years of proven building science and ongoing research resulting in homes that meet the rigorous energy savings, comfort, health, and durability standards of the U.S. Department of Energy's Zero Energy Ready Home program,” said Usher.

the fixtures while reducing the amount of cold water wasted. The home also has low-flow faucets and 1.28-gallon-per-flush toilets. Outside, the WaterSense irrigation system uses a weather station installed on the home's exterior to control watering periods and amounts based on the local weather conditions as well as plant type and topography. The sprinkler heads are designed to provide slower, more uniform, and accurate delivery of water.

To promote healthier indoor air, the home's HVAC has a fresh air intake, MERV 16 filter, and PCO (photocatalytic oxidation) air purifier. Addison also implemented all of the requirements of the EPA Indoor airPLUS program including using low-VOC

## KEY FEATURES

- **DOE Zero Energy Ready Home Path:** Performance.
- **Walls:** 2x6 24" o.c. advanced framed with insulated headers and 2-stud corners, R-13 unfaced fiberglass batt, OSB, 1" R-5 taped, R-18 total. Vinyl siding.
- **Roof:** Asphalt and PV shingles, ice-and-water shield in valleys and low roofs; kick-out flashing, synthetic felt, drip edge flashing, vent gaskets, tape flashing.
- **Attic:** R-38 blown fiberglass. All penetrations and top plates sealed. Skylight shafts have R-10 XPS foam and R-19 unfaced fiberglass batts.
- **Foundation:** Daylight basement of precast concrete walls with R-16 XPS foam, R-5 XPS under slab perimeter. Daylight wall has R-5 XPS.
- **Windows:** Double-pane low-e, U=0.30, SHGC=0.26. Solar tubes, venting skylights.
- **Air Sealing:** 1.51 ACH 50.
- **Ventilation:** Fresh air intake with ventilation controller and MERV 16 filter, spot exhaust.
- **HVAC:** Central heat pump 20.5 SEER, 10 HSPF, ducts inside. Insulated rigid trunk and flex branch. Return registers in every room, balancing dampers on every run.
- **Hot Water:** Tankless gas water heater, 0.95 EF, with smart controller.
- **Lighting:** 95% LED, 5% CFL, skylights, sun tubes, and roof windows.
- **Appliances:** ENERGY STAR clothes washer, refrigerator, dishwasher, ceiling fans, exhaust fans.
- **Solar:** 7.625-kW solar shingles, grid tied.
- **Water Conservation:** Low-flow fixtures and toilets. WaterSense irrigation controller.
- **Energy Management System:** Smart HVAC, solar PV monitoring system.
- **Other:** No-/low-VOC paints, adhesives; GREENGUARD-certified hardwood flooring, carpet, pad; non-toxic pest control, KCMA ESP-labeled cabinets, no added formaldehyde insulation. Laminated beams, I-joint floors, Finger-jointed trim and cabinets. Universal design.

*Photos courtesy of Addison Homes*