



United Way of Long Island

Housing for Heroes
Medford, NY



BUILDER PROFILE

United Way of Long Island
Deer Park, NY; unitedwayli.org
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FEATURED HOME/DEVELOPMENT:

Project Data:

- Name: Housing for Heroes
- Location: Medford, New York
- Layout: 4 bdrm, 2 bath, 1 fl, 1,936 ft²
- Climate: IECC 4A, mixed-humid
- Completed: March 2021
- Category: Affordable

Modeled Performance Data:

- HERS Index: without PV: 33
- Annual Energy Costs: without PV: \$1,800
- Annual Energy Cost Savings: (vs typical new homes) without PV: \$2,900
- Annual Energy Savings: 13,400 kWh
- Savings in the First 30 Years: \$119,300

Providing homeless veterans with a home that is healthy, safe, durable, and energy efficient enough to keep down operating costs for the sponsoring agencies, even on spendy Long Island, were all part of the wish list for Rick Wertheim, senior vice president of Housing and Green Initiatives for the United Way of Long Island Housing Development Corporation. To make it happen, Wertheim built this award-winning four-bedroom, 2-bath, 1,936-ft² group home in Medford, New York, to the exacting performance requirements of the U.S. Department of Energy's Zero Energy Ready Home program.

Wertheim is no stranger to high-performance home construction having built 20 homes certified to the DOE Zero Energy Ready Home program since joining the DOE program in 2015. In fact, every one of the five or so homes a year built by the United Way organization is certified to the program criteria.

Most of the United Way homes include solar panels on the roof and are considered net zero energy homes, homes with Home Energy Rating System (HERS) scores around zero because they produce as much power as they use over the course of the year. This home was not well situated for solar due to the number of existing trees on the urban infill lot. However, Wertheim was still able to achieve a HERS of 33 for the home, far better than the 80 to 90 HERS score typical of most just-to-code homes.

To achieve the low HERS score, Wertheim constructed the home to meet the criteria of the DOE Zero Energy Ready Home program, which requires builders to meet the checklists for ENERGY STAR Certified Homes and the U.S. Environmental Protection Agency's Indoor airPLUS, along with other efficiency requirements like the hot water distribution requirements of the EPA's WaterSense program; the insulation requirements of the latest International Energy Conservation Code adopted in the state; target HVAC and water heating efficiencies; third-party-verified air



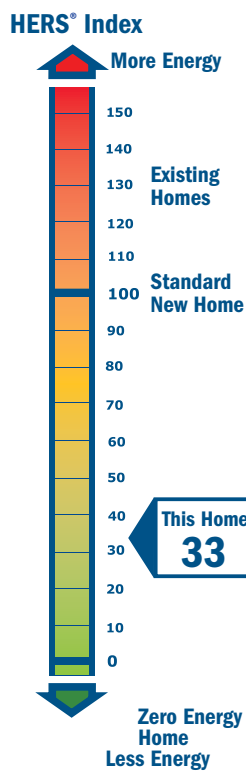
The U.S. Department of Energy invites home builders across the country to meet the extraordinary levels of excellence and quality specified in DOE's Zero Energy Ready Home program. Every DOE Zero Energy Ready Home starts with ENERGY STAR Certified Homes Version 3.0/3.1/3.2 for an energy-efficient home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

A gable roof with asphalt shingles tops the vented attic, which is insulated with 14 inches (R-49) of blown cellulose that fully covers the exterior wall top plates thanks to raised heel trusses. Triple-pane windows add to the high-performance envelope.



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.



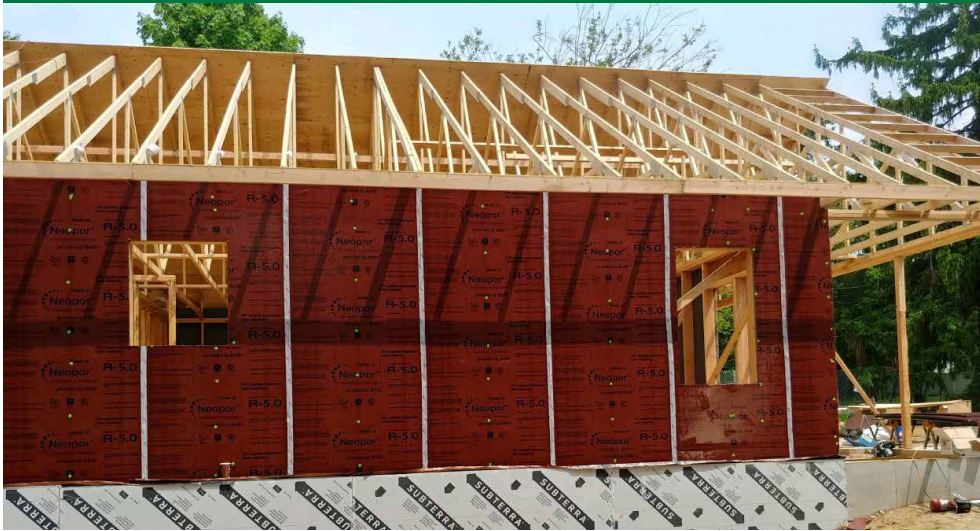
sealing targets; installation of ENERGY STAR appliances, windows, and lighting; and ducts in conditioned space. Homes must also have solar panels installed or have the conduit and electrical panel space in place for them.

In addition Wertheim chose some exceptionally high-performance equipment for the home. The home's space heating is provided by a ground source heat pump. The ground source heat pump is a 2.1-ton system with a central air handler. The heat pump has an operating efficiency of 5.47 COP and an average energy efficiency ratio (EER) of 26.04. The system's cooling efficiency is rated at 22 SEER, far above the 13 SEER required by minimum federal standards. Rigid metal ducts are located in the insulated basement or buried under 14 inches of blown insulation in the attic.

The builder uses a U.S.-made "thin triple" window consisting of two glass window panes and a thin center layer of stretched clear plastic film. The windows are primarily double-hung style and use insulated vinyl frames with an argon gas fill and low-emissivity coatings on two of the glass surfaces. These windows provide insulation values similar to a triple-pane window with a U-factor of 0.17 but without the weight of a traditional triple-pane window.

The home's walls are constructed of 2x6 studs installed at 24 inches on center. The walls incorporated advanced framing techniques such as 2-stud corners with drywall clips, open and insulated headers, and ladder blocking at interior wall intersections to reduce the amount of lumber needed and to provide more room for insulation. After the 2x6 studs were placed, the walls were sheathed with 1-inch-thick graphite-enhanced EPS rigid foam insulation board then topped with 7/16-inch OSB. Then the wall cavities were filled with 2 inches of closed-cell spray foam which is sprayed against the EPS. The remainder of the wall cavities was filled with 3.5 inches of loose-fill blown fiberglass insulation held in place by a membrane. This was covered with 5/8-inch gypsum board covered with latex paint, which serves as a class II vapor retarder. This wall assembly provides an insulation value of R-28. The exterior sheathing was covered with house wrap and PVC clapboard siding. Liquid-applied flashing was used around all doors and windows.

The truss roof used raised heel trusses to allow full space over the exterior walls' top plates for insulation. The vented attic was filled with 14 inches (R-49) of blown cellulose insulation. Soffit and ridge vents provide venting. The cathedral ceiling of the great room has scissor trusses.



Two-inch-thick graphite EPS insulation panels cover the basement walls while one-inch-thick graphite-EPS rigid foam covers the studs and 2 inches of closed-cell spray foam fills the wall cavities providing an airtight blanket for the walls. The above grade EPS is covered with 7/16-inch OSB sheathing, draining house wrap, and PVC siding.

The builder achieved a low air leakage of 1.44 air changes per hour at 50 Pascals (ACH 50) with exceptional air sealing practices including spraying closed-cell spray foam directly to the backside of the rigid foam wall sheathing in each wall cavity, installing gaskets at the top and bottom plates, and installing rigid foam blocking between trusses at the eaves and gun foaming it in place. All interior wall top plates were spray foamed after the ceiling gypsum board was installed. The floors were air-sealed at the rim joists with closed-cell spray foam where the gasketed plates and floor joists meet the foundation wall and all floor-to-floor penetrations and bypasses were gun foamed or fire caulked.

The exterior walls sit on 8-inch poured concrete foundation walls that are protected with a roll-on capillary break over the footings and an elastomeric foundation water proofing on the exterior of the walls, which were then wrapped with 2 inches of EPS graphite-enhanced foam insulation. The above-grade portion of the EPS was protected with fiberglass-reinforced panels.

A whole house dehumidification system was installed in the home for swing-season humidity control when the thermostat was not calling for cooling. An energy recovery ventilator and exhaust fans are connected to each other and to sensors and are controlled from the ground source heat pump control system. The heat pump air handler has a MERV 13 filter at the main return.

The home is equipped with a 50-gallon heat pump water heater with a Uniform Energy Factor (UEF) of 3.75. The geothermal (ground source) heat pump provides back-up hot water. The water heater is located in the basement and uses a central manifold distribution system with PEX piping to speed water from the centrally located water heater to hot water taps.

The refrigerator, dishwasher, and clothes washer are all ENERGY STAR qualifying. The whole home is certified to the EPA WaterSense program, which requires water-saving features such as the use of WaterSense-labeled plumbing fixtures, efficient hot water distribution, and smart or predictive irrigation. All stormwater roof runoff from downspouts is collected in a subsurface leaching pool system.

The home was designed to be handicapped compatible with aging-in-place features including a universal-design kitchen with knock-out panels for future sink base cabinet modifications, lower placed thermostat heights, higher placed electrical outlets, 36-inch bathroom doors with roll-in showers, lever handle sets for doors, color contrast between kitchen cabinets and the counter tops for the visually impaired, and no stairs

HOME CERTIFICATIONS

DOE Zero Energy Ready Home Quality Management Guidelines

DOE Zero Energy Ready Home Program - 100% Commitment

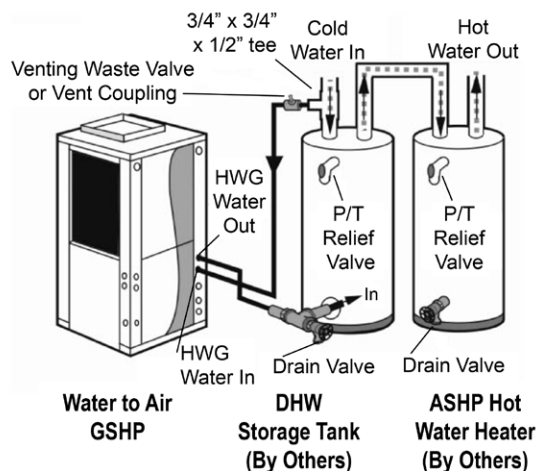
ENERGY STAR Certified Homes Version 3.1

EPA Indoor airPLUS

EPA WaterSense



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.



A geothermal (ground-source) heat pump provides space heating and hot water.

“Healthy, affordable housing should be universally available and attainable for all Americans. It should not be an afterthought or a zoning concession,” said Wertheim. United Way calls these homes “Attainable Housing,” a convergence of affordable and sustainable housing. “High-performance homes are in fact healthier homes to live in. Not only do you get superior energy savings and comfort, but DOE Zero Energy Ready Homes are detailed to provide better indoor air quality and a healthier indoor environment,” said Wertheim.

Wertheim is well aware that this, like all of his United Way projects, is funded with public or donated funds and he stresses that the energy efficiency and resiliency built into these homes support the goal of responsible stewardship of those funds over the life of the project. This home was built on land donated by Suffolk County from a tax foreclosure of an existing home that was torn down. Construction funding was provided by the New York State Homeless Housing Assistance Program. The group home will be operated by the not-for-profit Association of Mental Health and Wellness. “This project is “affordable” because it provides the taxpayers of NY with a cost-effective housing solution for homelessness,” said Wertheim. “Typically, homeless individuals are placed in shelters or transitional housing facilities (like a motel). These options are costly and NOT conducive to a healthy lifestyle for the occupants. A DOE Zero Energy Ready-certified home has sustainable energy savings, lower operational costs for the Agency, and a better quality of life for the residents. When stable, supportive housing is provided, occupant health (both physical and mental) increases and health care costs are reduced. These cost savings to tax payers are long term.”

Like all of his United Way projects, Wertheim used the construction of this home as an opportunity for training via the workforce training programs Wertheim operates through United Way. Those training programs include the U.S. Department of Labor YouthBuild program for low-income young adults and the VetsBuild program for veterans. The United Way also provides high-performance home-building and energy retrofit training for the Suffolk County Department of Labor’s Unemployed Worker Training program.

to enter the home (grade-level porch and doorway).

The home meets all EPA Indoor airPLUS requirements including the use of low/no VOC paints and solid wood and plywood cabinets that are low-formaldehyde products. Hard-surface luxury vinyl tile flooring is used throughout the home. An indoor air sensor is provided to measure particulates, VOCs, and humidity in the home and send results to a smartphone and connected HVAC system.

KEY FEATURES

- **Walls:** R-28 total: 2x6 24" o.c. advanced framed, 3.5 blown fiberglass + 2" closed-cell spray foam in cavity, 1" R-5 graphite EPS sheathing, 7/16" OSB, drain wrap, PVC siding.
- **Roof:** Truss gable roof: 5/8" plywood, synthetic underlayment, asphalt shingles.
- **Attic:** Vented attic: 14" R-49 cellulose, 14" raised heel trusses, ridge and soffit venting.
- **Foundation:** Insulated basement: 10" poured concrete foundation wall, exterior elastomeric waterproofing and 2" graphite EPS foam. Capillary break under footings.
- **Windows:** Triple-pane (thin film), argon filled, low-e2, vinyl frame, U=0.17, SHGC=0.20.
- **Air Sealing:** 1.44 ACH 50. 2" closed-cell foam at rim joist, top plates, and attic knee walls; drywall gasket at top and bottom plates.
- **Ventilation:** ERV, MERV 13 filters, 71 ATRE, 58 CFM, 20 Watts.
- **HVAC:** Ground-source heat pump 2.1-ton, central air handler, 5.47 COP, 26. EER, 22 SEER.
- **Hot Water:** Heat pump water heater, 50-gal, 3.75 UEF.
- **Lighting:** 100% LED, motion sensors, daylight sensors.
- **Appliances:** ENERGY STAR dishwasher, clothes washer, refrigerator.
- **Solar:** Solar ready: conduit in place, space in electric panel.
- **Water Conservation:** EPA WaterSense shower heads, toilets, central manifold with PEX piping, smart or predictive irrigation, stormwater management.
- **Energy Management System:** Smart internet connected thermostat for HVAC.
- **Other:** Accessible thresholds, thermostats, outlets, doors, showers, lever handles. Low emission paints, cabinetry, countertops, millwork, and flooring.

Photos courtesy of United Way of Long Island