

George Ryder Road, Cape Cod, MA

Habitat for Humanity of Cape Cod is staying on the cutting edge with all-electric homes.

Staff at the Cape Cod affiliate first started building all-electric homes because “it was the right thing to do.” Today, they push the envelope when it comes to what’s possible for small, affordable builds, keeping their original goal of better indoor air quality while continuing to improve homes’ technology and construction.



Design:

- Three-bedroom Cape-style unit with 1,254 sq ft of conditioned space and an unconditioned basement
- Has solar PV; homebuyers in similar builds have received solar credits and report low or no utility bill
- Separate ERV and HVAC systems, ducted mini split, and basement heat pump water heater
- R-19 fiberglass and R-11 rock wool insulation in the basement ceiling
- Above grade walls are 2x6 with batt insulation in the wall cavities (no continuous insulation)
- Switching to Matthews Bros. U-19 windows from Anderson U-29 was actually a ~\$2k savings per house
- Siding is Cape-style cedar shingles on most builds

Financing:

Additional costs associated with building an all-electric home:

Framing	\$200
Insulation	\$400
Hot water heater (heat pump)	\$700
Air Barrier system	\$800
EV plug	\$200
Additional cost (without solar panels)	\$2,300
Solar panels*	\$25,000

*costs fluctuate, current cost as of fall 2023 for 3br project

Energy Specifications:

HERS® Index Score: -11
Building Envelope Specs
Ceiling: R-49
Above Grade Walls: R-21
Foundation Walls: N/A
Exposed Floor: R-43
Slab: N/A
Infiltration: 169 CFM50 (0.79 ACH50)
Duct Insulation: Supply: R6, Return: R6
Duct Lkg to Outdoors: 28 CFM @ 25Pa (2.23 / 100 ft²)
Window & Door Specs
U-Value: 0.19, SHGC: 0.22
Door: R-5
Mechanical Equipment Specs
Heating: Air Source Heat Pump • Electric • 12.5 HSPF
Cooling: Air Source Heat Pump • Electric • 20.5 SEER
Hot Water: Residential Water Heater • Electric • 3.45 Energy Factor
Average Mechanical Ventilation: 46 CFM

Lessons Learned

- “Your work is only as good as the help you have”: good contractors and HERS raters are key to helping keep costs down, get the best incentives, and implement the best technology. A trusted HERS rater is one of the biggest benefits to the building science side of a project.
- Used new Hunter Cooper heat pumps to get to the performance necessary for HERS requirements; though their HVAC contractor was less familiar with them, ease of installation was not an issue.
- They expect the cost of continuous insulation would offset the \$10k in additional incentives, as well as increase construction time, and do not plan to move in that direction.
- Use an air barrier system after drywall but before painting: safe, low-VOC latex spray product that enables contractors to seal to the desired ACH50. Contractor also did the work at cost, saving \$1,200.
- Homebuyer education around mechanical system filters is key; skilled volunteers are willing to educate.