

**Participant information**

GreenTech Construction  
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**Category**

Single Family Homes (under 3,000 sq ft.)

**High Performance:**

Yes

**Project information**

Legacy House  
5616 Butternut Drive  
Lewis Center, OH 43015

**Date Completed:**

August 2019

**Total cost of project (exclusive of land):**

\$600,000

**Dimensions of building (all floors of multi-story building):**

Unfinished basement: 33'x52'. First floor: 33'x52'. Second floor loft: 25'x30'.

**Total sq. ft. of conditioned space:**

First and second floor living space totals 2466'. The unfinished basement is conditioned and half of it will someday be finished space. Therefore, if including the basement, the total conditioned space is 4182.

**Built By (if different than applicant)**

GreenTech Construction  
7591 Perry Road  
Delaware, OH 43015

**Panels Manufactured By Company Name (members only):**

MM&I Construction Renegade Panels manufactured by Insulspan

**Designed By (if different than applicant - SIPA will only recognize members)**

F5 Design/Architects  
Todd Parker  
P.O. Box 86  
New Albany, OH 43054

**Total sq. ft. of conditioned space:**

First and second floor living space totals 2466'. The unfinished basement is conditioned and half of it will someday be finished space. Therefore, if including the basement, the total conditioned space is 4182.

**Describe the end use of the building:**

Single family home for George and Sharon who are both retired.

**How did SIP construction help you get this job?**

We are one of 13 "Preferred Builders" selected by the developers of Evans Farm in Lewis Center, OH. The homeowners discovered we were the only builder who used SIPs and focused on green building.

**SIP wall thickness and core material:**

Insulspan 6" eps except for tall eastern wall which is 8"

**SIP roof thickness and core material:**

Insulspan 12" eps

**Describe the benefits of using SIPs on this project. Did SIPs help save time, labor, construction costs, or energy?**

The RTA (Ready to Assemble) package sped the construction process and whatever small increase in the cost was overcome when considering the savings in utility bills and comfort the owners enjoy. I have worked extensively with the same crew and they have told us they prefer SIPs construction over studs.

**Describe any innovative design elements or structural engineering involved:**

Our engineer stated that the tall eastern wall would have necessitated the use of vertical steel flitch plates between the LVL's to support the roof if we had used 6" panels but incorporating 8" SIPs eliminated the steel and the potential that the steel could have posed a condensation problem within the wall cavity.

**Please list any certifications the project received, such as ENERGY STAR, LEED, National Green Building Standard, WELL, Passive House, Green Globes or local green building programs. Only list certifications that are completed:**

The home is certified by the U.S. Department of Energy (DOE) as a Zero Energy Ready Home. Also certified under the EPA WaterSense for New Homes Program.

**HERS Index (required only for High Performance Category and recommended for residential projects):**

HERS Index: 17

**Blower door test results (ACH50) (required only for High Performance Category and recommended for residential projects):**

.53 ACH50

**Energy use intensity in kBtu/ft<sup>2</sup> (required only for High Performance Category and recommended for commercial projects):**

Ceiling Heat: 3kBtu/ft<sup>2</sup> Cooli

**Describe the HVAC system used on the project:**

Mitsubishi ducted mini split which will heat down to -12 degrees F.

**Describe any other energy-saving materials used in the building envelope other than SIPs. List U-values of windows used and the U or R-value of any insulation materials. (judged only for High Performance Category):**

Marvin triple pane low-e windows throughout: U: .21 2" extruded foam beneath the entire basement concrete slab. 10' Superior Walls precast foundation with R12.5 Dow foam pre-installed at factory. With additional R-20 fiberglass wall nets out at R32.

**Please list any energy-efficient products or design features, such as lighting, hot water heating, appliances, passive solar (judged only for High Performance Category):**

All lighting is LED. Heat pump hybrid electric water heater rated by EPA at \$170/yr. estimate (Solar panels producing nearly all of its needed electricity.) Energy Star appliances. Energy Recovery Ventilator for fresh air.

**Were any solar panels installed on the project? If so, indicate the size of the system (judged only for High Performance Category):**

LG Solar PV system. 20 modules producing 7200 peak DC watts and 5800 peak AC watts. Monthly production reports via the internet from Enphase Energy.

**Please list any sustainable materials or design features not listed above, such as recycled materials, low-VOC finishes, landscaping, etc. (judged only for High Performance Category):**

All homes in development are on small lots minimizing landscaping needs. All adhesives and paint finishes are Zero or Low-VOC. Boral t&g siding installed on interior vaulted ceiling which uses fly ash and is Cradle to Cradle Certified as being sustainable. Drexel metal roof uses 30-60% recycled materials and lasts 2-3x longer than asphalt roofs. A cross section of perforated pvc piping installed beneath the concrete slab for Radon mitigation. After installing an inline fan the RadonAir detector indicates consistent levels below .5pCi/L.

**Any additional comments on the project:**

More and more educated customers reach out to us wanting a healthy, comfortable, energy efficient or High-Performance Home. George and Sharon were a pleasure to work with.

**Power:**

Attached find our AEP tracking spreadsheet. You will see that our power use was up quite a bit in the last two months. The main causes for this are colder and very cloudy weather. The light red column shows power delivered; the light green column shows power generated. We have also had guests here recently, and used the Tesla Model 3 car quite a bit more than usual driving them around. The DOE estimate for annual energy cost was \$950 or 5714 kWh. With two months to go on our first year, we appear to be pretty much on target -- particularly keeping in mind that the DOE Zero Energy Ready Home calculations do not include the car.

The ENPHASE lifetime report (as of today) that the solar panels have produced 9.12 MWh of power and saved 165 trees. Note that this includes time before we started our monitoring spreadsheet.

We have not used the resistance heating capability of the Mitsubishi air-sourced heat pump (breakers off) nor have we made any significant use of the pellet stove. The pellet stove might help reduce power consumption on coldest days when the heat pump's efficiency drops off. The Honeywell ERV has done a super job of maintaining constant and comfortable humidity.

Building in radon collection tubing under the basement floor was a great idea. Passively vented, the system generally kept the radon level in the basement below though near the U.S. recommended limit. By adding an Energy Star rated fan, that level was reduced by a factor of 10 to about .5 pCi/l. A very good number, indeed.

**Owner's General Impressions:**

As you know, the house's general design was a collaborative effort between the building architect, builder, owners, and town architect. While there were many compromises, We are quite pleased with the result from both appearance and function standpoints. In aspects of construction that could affect energy consumption, you did everything you could to see that the correct systems, methods, and practices (and lots of foam) were employed.

The framing craftsmen utilized on the project had really good SIPS experience, something that came in very handy as we made a few little tweaks on the fly. The trim carpenters selected were a joy to work with and did a truly super job of making the simplicity we wanted look very well done.

Coming from a very dark home, we like the openness and light of the great room/kitchen area very much. We think the use of high-quality triple-pane UV rejecting Marvin windows, quality multi-point lock doors, and the large ceiling fan in this space are keys to its practicality.

**Conclusion:**

We built our "Legacy House" simply because it was something we could do to address the global climate crisis. We placed it at Evans Farm, a New Urbanism community, because wanted a site that would permit us to walk to shops, recreational facilities, the post office, schools, and the like. We wanted something closer to our neighbors. In the long-run, a community is not sustainable if it's made up of nothing but quarter acre patches of grass upon which are planted ticky-tacky houses serving as a motel for the folks inside. It's not a community if you have to jump in the car to access all your services, if you never see the folks next door. It's not emotionally healthy nor environmentally nor economically sound. We did not want to leave a quarter acre legacy to our family when times are-a-changing. That's why this house is a "Legacy House".