GEOTHERMAL INSTALLATION

Spotlight

Hydron Module Geothermal Systems

"Living Building" Home

Ann Arbor, MI

With about 5 years of design and construction, this home's sole intent is for true sustainable living. Nestled on 15 acres of farmland, it is one of the most eco-friendly homes in the world. Certified in 2017 by the International Living Future Institute, this "Living Building Challenge" home uses no fossil fuels for heat or power. The homeowners have a passion for instilling knowledge and inspiring others to live sustainably and are in the process of becoming a not-for-profit farming operation (Beacon Springs Farm, LLC) where all excess food gathered will go to Food Gatherers and Hope Clinic to provide fresh food for those who cannot afford it.

The Home's Unique Features:

To achieve net-positive status, the house has a 60-panel solar array and a Trombe wall. It has a Geo-Store Hot Water Tank and a Fantech HRV system. The home was built to be air-tight with the following features:

- R-values of insulation:
- Slab and basement walls: R-30
- Above-grade walls: R-48
- Roof/ceiling: R-68
- **ResNet HERS Index** of energy efficiency: –10
- Usual range for a net-zero energy-ready home: < 30
- Typical American home: 100

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PROJECT DETAILS

Home Size:	5,000 sq. Ft. (including barn and workshop)
Loop Type:	Horizontal-loop geothermal heat pump system
Geothermal Equipment:	Two-Stage Multi-Positional Vertical Combination Geothermal System (CT048)
Installation Date:	Fall 2016
Contractor / Installer:	Rob Derksen of **Michigan Energy Services**
Builder:	Michael Klement of **Architectural Resource LLC**, Wayne Appleyard of **Sunstructures Architects**, Dave Stark of **Rainwater Management Solutions**, Bob Burnside of **Fireside Home Construction**, Amanda Webb Nichols of **Catalyst Partners**, Shannan Gibb-Randall of **InSite Design Studio**, and John Wakeman of **SUR Energy**
Payback Period/Yearly Heating/Cooling Costs:	During the required 12-month LBC audit period, the house generated 20,270 kWh of electricity, and used 15,987 kWh, producing 26 percent more energy than it used. 4,283 kWh were pushed back to the electric utility grid, moving the home past net-zero into net-positive. **Estimated Annual Operating Costs:** Heating: $ 437 Cooling: $50 Hot Water: $57 Total/year: $543

CONSTRUCTION TYPE
New Construction

APPLICATION TYPE
Radiant-floor heating

APPLICATION TYPE
Forced-air heating and cooling (shoulder seasons)

APPLICATION TYPE
Domestic water heating (supplementing a heat pump water heater)

LOOP TYPE
Horizontal Loop

Clockwise from top left:

View from the home to the storage shed/garage

The kitchen, which opens up to the dining area

The living room, featuring a portion of the dining area

The geothermal system and hot water tank, allowing for ample storage space in the mechanical room

