

## The “Granite Hill Project”

The “Granite Hill Project” was the show home for the 2009 Michigan Energy Fair, having hundreds of green/sustainable minded people touring the home over a three day period. The home was built on a pristine 60 acre parcel in Kingsley Michigan, with the home situated in the middle of a 40 acre field next to a hill of granite boulders, thus giving it the project name. This home is a site specific, Passive Solar Arts & Craft style home built with BuildBlock ICF (*Insulated Concrete Forms*) for all of the bearing walls. The exterior elevations of the home were designed with deeper roof overhangs, determined by using solar calculations, to both maximize and minimize the sun exposure based on the time of year. The exterior used two of our favorite products James Hardie FiberCement Siding and Andersen 400 series double-hung and awning windows. The interior of the home has stained concrete floor and re-claimed tile on main level of the home which makes for great thermal mass. The home was also designed with lifetime design principles and has zero step entries.

Part of the site specific design was to locate the future detached garage/barn to act as a wind break, to stop snow drifting from the northwest prevailing winds that we have here in Michigan. Part of the passive solar design of this home was to pay close attention to detail on the Southside of the home, where most of the homes windows face south. In the winter, the sun will warm the living space during the day and shine on the concrete floors on the main levels which will store some of the heat gained, for gradual release. The roof overhang will shade the house from excessive solar heat gain in the summer, and west-facing glass is minimized to reduce cooling needs in the summer. ICF construction was perfect for this project because of its exposed building location.

The “The Granite Hill Project” is designed to be **Zero Energy Home (ZEH)** and a **Carbon Neutral Home** thanks to the Passive Solar Design, Tulikivi Masonry Unit Heater, Solar Hot Water, the future installation of Photovoltaic’s and a Wind Generator that the home is pre-wired for. The home has no mechanical heating or cooling system. Passive solar heating is complemented with the Tulikivi masonry unit heater (That also has a bake oven) and baseboard electric heat, resulting in a Zero Carbon Emissions Home that does not rely on any fossil fuels. The **Tulikivi** fireplace is its healthy radiant heat output and use of a local, renewable, **carbon neutral fuel** – wood. Tulikivi fireplaces supersede the strictest air quality standards in the world. Typical wood-burning fireplaces send the majority of their heat up the chimney; not so with a Tulikivi. The soapstone soaks up the fire’s heat as it burns, stores it and then gently and steadily releases it for 12-24 hours even after the fire is out. Tulikivi is recognized by the Finnish Allergy and Asthma Federation as a heating option for those households where asthma or allergies are a key concern, due to the extremely low particle and helping our project earn points toward its LEED certification.

Besides the pending LEED for Homes “**Gold**” certification this home received 5+ Energy Star certification and a HERS score of **52**. This home will be 48% more efficient than typical construction of a similar home of this size. In addition this homes toilets, faucets

and shower heads are super low-flow for superior water efficiency. The home also has low-VOC paints, adhesives and finishes and uses recycled content for the flooring, decking, foundation and siding. Every possible piece of residual material used in construction was recycled

### **Key Sustainable/Green Features**

- Rain Permeable Gravel Driveway.
- Property (60 acres) is managed for wildlife habitat and water quality.
- Lifetime Design (*Barrier Free*)
- Zero step entries.
- Energy Star Andersen 400 Series Windows.
- Energy Star LED & CFL lighting.
- Energy Star Ceiling Fans.
- Energy Star Appliances.
- Energy Star rated Kasselwood metal roof shingle (*with 30% recycled material*)
- Soy Based Open Cell Wall & Attic Insulation.
- Advanced Framing (Studs @ 24" o.c.)
- BuildBlock ICF Construction (*with 40% Fly-Ash*)
- James Hardie FiberCement siding
- Concrete Countertops
- Locally Harvested Hardwood Floors
- Re-Use Tile Floors
- Concrete Floors (*Stained*)
- No-VOC Paints and primers.
- Low-VOC caulks and sealants.
- Finger Jointed Studs on all interior walls.
- FSC certified woods.
- FSC certified Kitchen Cabinets.
- Dual-Flush toilet by TOTO.
- Re-Use Tub & Sink
- Low flow shower heads and faucets.
- Pex Plumbing.
- Radon Venting.
- SunTouch® electric radiant heated floor mats
- ERV (*energy recovery ventilator*)
- Tulikivi Masonry Unit Heater (*30% Tax Rebate for 75% Efficient Bio-mass Burning Stoves*)
- Passive Solar Design.
- Solar Hot Water. (*30% Tax Rebate*)
- Pre-wired for future Photovoltaic's
- Pre-wired for a future Wind Generator.

*By Eric A. Hughes of Image Design, LLC*