

How We Achieve Net Zero Energy Use

Using photovoltaic solar panels and geothermal heating and cooling, combined with super insulation (insulated concrete form walls, triple-pane glass) and heat recovery ventilation, these buildings consume less energy than they produce (when occupied by an average family), or put another way, they achieve "net zero energy use". The systems described below work together to make the home of tomorrow a reality.

- Solar(photo-voltaic) Panels
- Geothermal
- Heat Recovery Ventilation
- Heating and Cooling
- Super Insulation & High-Efficiency Window



HOW IT WORKS

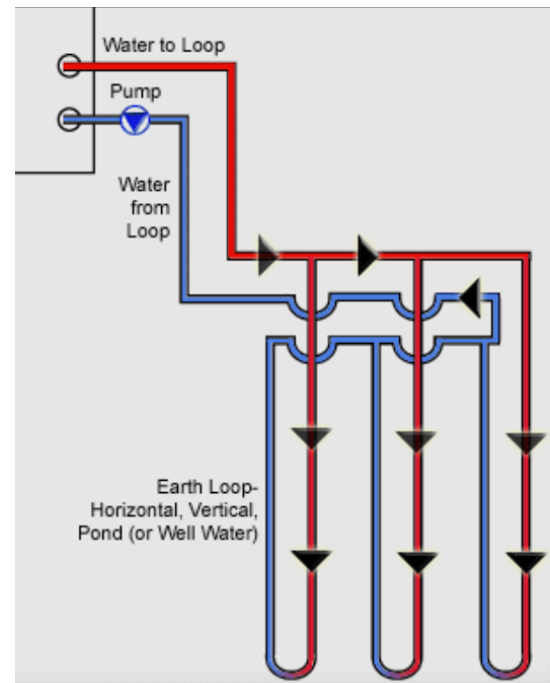
Solar (photo-voltaic) Panels

Positioned on the south-facing roof of the home, a relatively large residential system (typically 8 kilowatts) will produce all your home energy needs (for an average family). Through "net metering," the utility company measures net consumption of electricity over the year, allowing the resident to produce electricity for the grid during the day while taking electricity from the grid at night. To account for significant seasonal variation in production and consumption, the utility will measure your total "net" consumption over the year for final billing reconciliation. In fact, the utility will pay you for any excess electricity produced over the year (at wholesale prices).



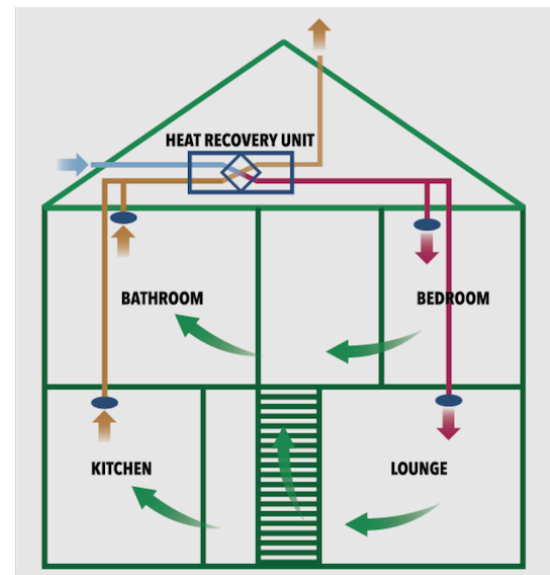
Geo-Thermal Heating and Cooling

Due to the tremendous efficiencies gained by using the constant temperatures of the earth, a ground source heat pump (GSHP) provides all the heating and cooling needs of your home, requiring far less electricity than more conventional systems. A GSHP circulates an antifreeze solution through a closed loop, installed vertically or horizontally in the earth. The fluid gathers heat from the earth for the house in the winter and reverses itself and pulls heat from the home and places it in the ground in the summer.



Heat Recovery Ventilation

Last but not least, a heat recovery ventilation system is used to "recover" energy from outgoing tempered air that is completely lost in conventional homes (recovering up to 80% of the energy). The system also ensures consistent, superior air quality as an added benefit.



Super Insulation and High- Efficiency Windows

Our homes are constructed with insulated concrete forms (ICFs) from the foundation to the roof. Not only are ICFs air-tight, but the layers of polystyrene enveloping 6 inches of reinforced concrete make for an extremely strong, durable home with insulating properties at or near the very best available. Where ICFs cannot be used, expanding foam insulation and air tight sealing ensure absolutely superior energy efficiency performance. Our windows -triple-paned, inert gas filled, low-E -exceed Energy Star performance criteria by at least 30%. Finally, we use twice the insulation required by Energy Star beneath the slab (4 inches total rigid insulation providing R-20) to complete our ground-to-roof, energy efficient thermal envelope.



Insulated Concrete Forms (ICF)

When you're building a concrete home, you can't beat the benefits of building with Insulated Concrete Forms. Insulated Concrete Forms provide a lightweight, high-strength alternative to using steel or wood frames.

What are Insulated Concrete Forms?

Insulated concrete forms (ICF) are hollow foam blocks that are stacked into the shape of the exterior walls of a building, reinforced with steel rebar, and then filled with concrete. Insulated concrete forms combine one of the finest insulating materials - Expanded Polystyrene (EPS) - with one of the strongest structural building materials - steel reinforced concrete. The result is a wall system of unmatched comfort, energy efficiency, strength and noise reduction.



ICF Provide Several Advantages

Home Owners appreciate:

- Lower energy costs due to the energy efficiency built in. (Energy Star Certified)
- Sound-blocking ability with a STC rating of 51+ - creating a quiet space.
- Low maintenance due to mold, rot, mildew, and insect resistance.
- Increased security due to steel reinforced concrete walls.
- Disaster resistance with a fire rating up to 4-hours and wind resistance exceeding F5 hurricanes and tornadoes.
- Cost savings with lower insurance premiums.
- Increased comfort and health benefits of improved air quality with 75% less outside air infiltration.
- Easier to meet higher energy code mandates with ICF construction.



ICF construction provides both structural and thermal components of the wall. These walls are well insulated, inherently tight, and durable. The foam provides consistent thermal performance and minimizes thermal bridging. The concrete makes the walls airtight. Additionally, ICF walls are highly resistant to fire and wind. The thermal mass properties attenuate sound well and help create a uniform and stable temperature inside the house. ICF walls are usually built using rigid, insulating foam block forms that are stacked on site and remain in place after the concrete is poured.”-U.S Department of Energy