

Getting to Zero-Energy Building

Green Building Roundtable

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The 2030 Challenge

- **2030 goal:** Fossil Fuel Reduction of **100%** for all new buildings (using no fossil fuel green house gas emitting energy to operate)
 - Can one even do this?
 - It must cost a fortune!
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A Massachusetts Utility sponsored “Zero Energy Challenge”

- To competition to “encourage builders to design and construct homes, which use considerable less energy than homes built with traditional practices, products and technologies”.
- 6 builders were chosen.
- There is \$50,000 in prize money.
- The lowest HERS Index wins!







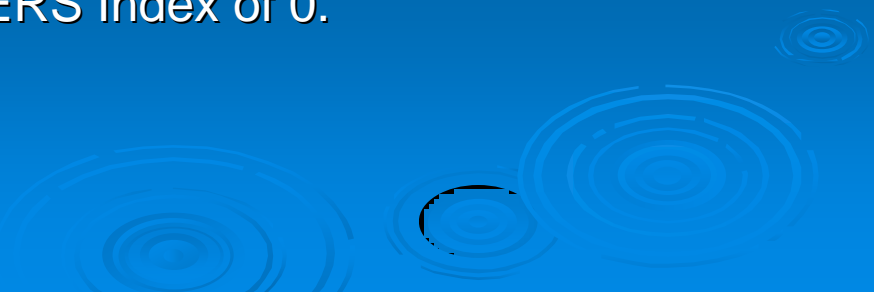








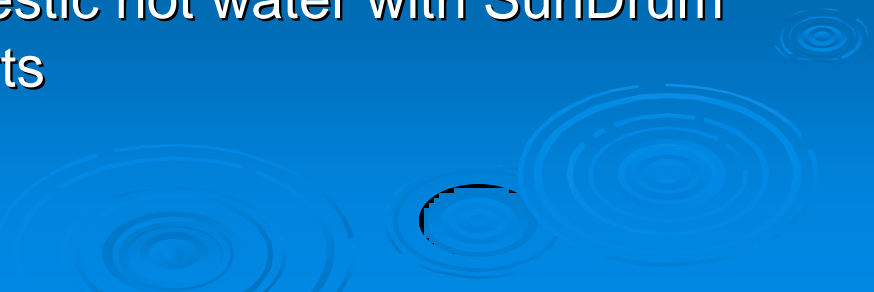
Zero Energy Home

- A Zero Energy Home is designed to produce as much energy as the home consumes over the course of a year.
 - Another definition of a Zero Energy Home is one that has a HERS Index of 0.
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How we did it...

- Super insulation (R75 attic ceiling, R49 walls)
- High efficiency windows (R5 triple pane with krypton gas)
- Heat recovery ventilator (LifeBreath 155)
- Air source heat pump (Mitsubishi Mr. Slim)

How we did it, continued...

- Tight air sealing (175 CFM @ 50 Pascals after foam insulation)
 - PV solar electric generation (5.7 kW)
 - Solar domestic hot water with SunDrum panel inserts
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Peak Heating Load

- This Coppersmith Way home has a peak heating load of about 10,500 BTU's.
- In other words, it can be heated from a design temperature of 6 degrees F outside to 70 degrees inside with two 1500 watt hair dryers and a 80 watt light bulb!

Marginal costs

- Framing double studded walls, rafters \$1,670
- Super-Insulation \$5,970 (\$14,000 - \$8,030 standard)
- PV system \$5,970 (\$33,000 - \$25,200 MTC rebate)
- SunDrum hot water heating system \$8,000
- Windows \$689 (\$4342 went to \$5,031)
- **Total additional marginal costs \$22,299**

Marginal Savings

- 1" Rigid on the outside of the house -\$2,258
- Trim on the windows -\$1,328
- Heating system (compared to \$6800) -\$1,550
- **Total savings -\$5,136**

Net Marginal Cost for "Affordable" Zero Energy Home

- **\$17,163**
- **Less 2008 Fed. & State tax incentives - \$5,000**
- **Net after tax incentives \$12,163**

On the Drawing Boards...

- Transformations is permitting a 24 unit near Zero development in Harvard, MA
- Transformations is in the build out phase of a (4) lot conservation development of Zero and Near Zero Energy Homes in Princeton Massachusetts.
- Transformations has been selected as the developer-builder for a 24+ unit Eco-Village on the North shore.

Resources...

- The Massachusetts Technology Collaborative (MTC) website: www.masstech.org
- The DSIRE website has lists of utility sponsored financial incentive programs, MTC Renewable Energy Trust rebates, and all state and federal energy efficiency tax credits: <http://dsire.org/>
- The Transformations, Inc. website: www.Transformations-Inc.us