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New York State

Launches Ground-Breaking Research

The New York State Energy Research and Development Authority (NYSERDA) is facilitating the use of innovative technologies to improve the State's energy, economic and environmental wellbeing. The State is investing more than \$100 million over two years to help manufacturers control energy costs. As part of their High-Performance Residential Challenge initiative four insulating concrete form (ICF) and structural insulated panel (SIP) homes will be constructed to serve as research laboratories on sustainable building systems and models for energy efficient building in northern climates.

One of the homes — the Kraft Residence — features an expanded polystyrene (EPS) ICF foundation and first floor walls. Rich Kraft, a builder from Tupper Lake, NY, partnered with research engineers and NYSERDA and the Institute for Building Technology and Safety (IBTS) to construct a unique energy efficient ICF home. Kraft went toe to toe with the task of constructing a home that was responsive to his Adirondack mountain site and performed at optimal efficiency. He discovered he did not have to sacrifice custom design elements to achieve maximum energy efficiency.

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The design team worked with Kraft to optimize the home design with a focus on the building envelope. In addition to ICFs the home will feature an EPS structural insulating panel (SIP) roof. SIPs provides an airtight roof with high R-Value that reduce heat loss and prevent moisture related issues that commonly arise in wood frame roof systems with cavity insulation. The high performance roof also contributes to a comfortable and even temperature inside the home, both day and night, especially in the warm summer months.

Expanded polystyrene offers unique benefits over traditional building materials. EPS is an efficient insulating technology that is resistant to mold, mildew and rot due to its high water resistance. Because expanded polystyrene ICF homes are so efficient, HVAC systems are typically downsized up to 50% from what would be required in a conventionally constructed home of the same size. There is also less wear and tear on the HVAC systems installed in ICF homes because they cycle on and off less frequently. And, ICFs reduce sound penetrating through a wall by over 80% when compared to wood-frame construction. A typical wood framed home has an STC rating of 33; ICF homes consistently achieve STC ratings of 55 and higher.

When completed, the Kraft house will be approximately 1,700 square feet, with three bedrooms, a walk-in basement and first floor. The researchers estimate the Kraft's' annual heating fuel costs will be less than their electricity costs for appliances and



lighting. Initial estimate suggest it will cost \$200 per year in propane to heat water and run the radiant system in the house. Impressive for a home located in an area where Heating Degree Days approach 9,500 and temperatures dip to 30-40 degrees below zero in the winter. Eventually, Kraft plans to include solar panels on the roof.



An EPS SIP roof panel is hoisted in place to join the ICF wall section.

Chris Fennell of BuildingInsight is serving as an engineer with IBTS. He is working on the Kraft house and other ICF projects around New York; each very different:

- A "zero-energy" Habitat for Humanity home in Westchester County that will produce as much power as it requires.
- An "urban infill" ICF home by Ithaca Neighborhood Housing Services that will be built on a vacant lot by the non-profit Neighborhood Housing Services.
- A test home for a planned 41-lot energy-smart housing development in Newburgh, NY.
- A 2,000 square foot house in Yonkers, New York modeled after five SIP research homes built at Oak Ridge National Laboratories. The home will be built in a low income neighborhood by the Yonkers chapter of Habitat for Humanity who regularly specify ICFs in their homes.

Kraft's house was planned so engineers from the Institute for Building Technology and NYSERDA can monitor heating, cooling and energy costs for one year. NYSERDA will host workshops on construction techniques for each of the four lab houses. For more information on the Kraft House and other New York state energy initiatives visit NYSERDA at <http://www.nyserdera.org/default.asp> ■



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