



## Building America Case Study

Technology Solutions for New and Existing Homes

# Stand-Off Furring in Deep Energy Retrofits

Syracuse, New York

### PROJECT INFORMATION

**Project Name:** Deep Energy Retrofit

**Location:** Syracuse, NY

**Project Partners:**

GreenHomes America,  
[www.greenhomesamerica.com/](http://www.greenhomesamerica.com/)  
IBACOS, [www.ibacos.com](http://www.ibacos.com)

**Building Component:** Building envelope

**Application:** Single-family retrofit

**Year Tested:** 2012

**Applicable Climate Zone(s):** Cold

### PERFORMANCE DATA

Cost of energy efficiency measure  
(including labor): \$23,518

Projected energy savings:  
Approximately 50% overall savings

Exterior insulation is a proven home retrofit strategy that is effective for cutting heating and cooling energy use while reducing potential moisture problems in walls. In this project, U.S. Department of Energy Building America team IBACOS and GreenHomes America collaborated with the New York State Energy Research and Development Authority Advanced Buildings Program to research a variation of a commercial curtain wall assembly for home construction as part of a comprehensive whole-house deep energy retrofit (DER) package.

This DER project improved the exterior building envelope of a home in Syracuse, New York, with the use of closed-cell polyurethane spray foam insulation. The team attached 2 × 4 framing members to the exterior wall at band joists and top plates using an “L” clip and applied spray foam to insulate the new exterior wall after the framing was installed. New windows with a U-value of 0.25 were installed as the framing was constructed, including extension jambs. The project team also sealed the below-grade foundation to the wall connections and the roof-to-wall connection with insulation that provided an air barrier.

This stand-off furring strategy minimizes the physical connections to each existing wall stud, uses spray foam to encapsulate existing siding materials (including lead paint), and creates a vented rain screen assembly to promote drying. As a result, typical mechanical systems can be downsized, and performance results yield a reduction in whole-building energy load of at least 50%. Data from a sample of field installations indicate that the incremental cost, when installed as part of a typical siding and window replacement job, is approximately \$10/ft<sup>2</sup> of wall area.

*“The deep energy retrofitting process goes beyond a typical home energy efficiency project. The exterior energy upgrades we performed are expected to turn those drafty, chilly houses into models of energy efficiency while still being cost efficient.”*

– John Scipione, General Manager,  
GreenHomes America—Syracuse

## Description



Contractors install blown insulation in the attic.



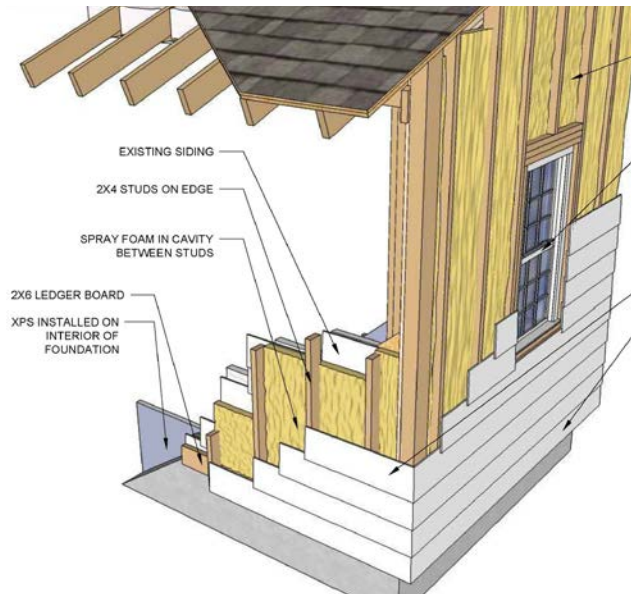
The team also installed a new energy recovery ventilator in the basement and used spray foam to insulate the rim band joists.



The framing is in place, spray foam is installed, and T-Ply is being installed. The next step is new siding.

For more information, see the Building America report, *Spray Foam Exterior Insulation with Stand-Off Furring*, at [www.buildingamerica.gov](http://www.buildingamerica.gov)

Image credit: All images were created by the IBACOS team.



For this stand-off furring DER strategy, IBACOS designed a detail with 2 × 4 studs installed on edge over the existing siding. This provided room for the team to install spray foam after build-out and then to cap off the DER with new siding.

## Lessons Learned

- The new wall build-out can tend to be wavy due to the state of the existing siding. Contractors need to compensate for that during wall build-out.
- Bracket stability could be an issue. Instead of using only one bracket at the top and bottom of each 2 × 4, three brackets could be used to keep the 2 × 4 stable. Another option would be to use one bracket on the left of the 2 × 4 at the top and one on the right of the 2 × 4 at the bottom. Finally, “picture framing” the spray foam will help with the rigidity of the 2 × 4s and help keep them in place.
- The team removed old windows and replaced them with new while the framing for the DER wall was being installed. This allowed for sections of wall to be completed but left a gap between the old and new walls that had to be addressed.
- The original estimated cost for the DER increased due to the unexpected cost of installing new siding and new windows. Originally, the team intended to reuse the old windows and siding if those were in good shape.
- A builder should do adequate preparatory work with a spray foam application and window setup.

## Looking Ahead

The team plans to implement this strategy on other homes and compare the use of rigid foam in place of spray foam. The team is monitoring this house to determine the energy savings resulting from the DER. Monitoring includes indoor and outdoor temperature and relative humidity, run time of the space heating system, blower door tests, and collection of homeowner utility bills.