

## Builder's Guide to Energy-Efficient and Durable Wood-Frame Walls

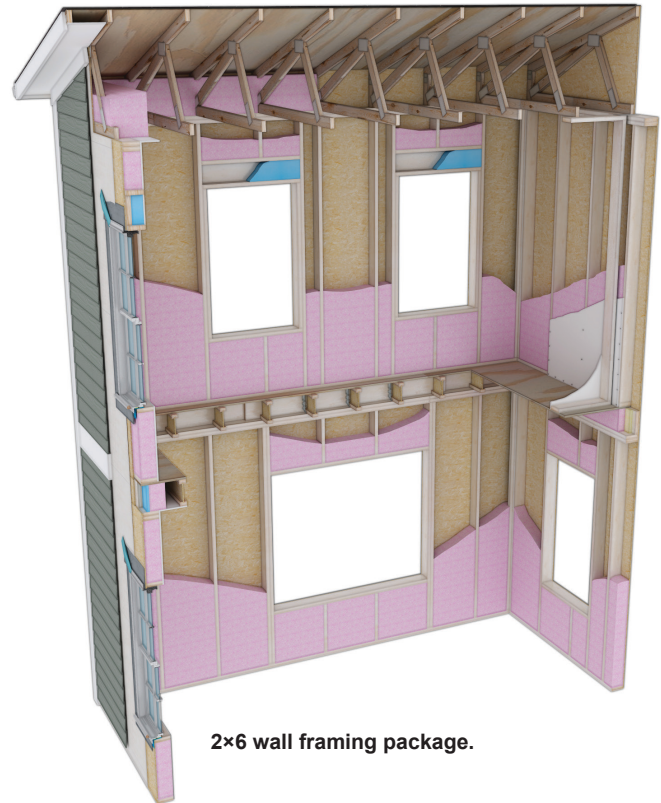
High-R walls continue to remain an underutilized technology, even among more advanced builders. Results of the Home Innovation Annual Builder Practices Survey showed that in 2013 only 6% of homes used 2×6 at 24-in. on center framing and only 10% of homes used exterior rigid foam over wood structural panels. Yet new model energy conservation codes and various state/local energy and green programs encourage, often mandate, increases in energy efficiency; so builders need practical and actionable construction solutions to help with transitioning to high-R wall systems. General approaches to increasing R-value in walls are available, but their practical implementation is limited by lack of specific details and by concerns over long-term moisture performance and hazard resistance.

### Background

The 2012 International Residential Code (IRC) of the International Energy Conservation Code (IECC) introduced significant increases in minimum wall insulation R-values. Building codes began requiring wall insulation levels significantly higher than standard practices used for decades. The code provides two primary paths for compliance—increasing the cavity insulation or adding exterior insulation. Although the code lists minimum requirements for insulation, vapor retarder claddings, sheathing, and other wall elements, it does not provide integrated solutions for an entire wall system or options for best practices that minimize performance risks.

### Objective

The objective of this project is to develop a Builder's Guide to support and accelerate wider adoption of energy-efficient wall systems in residential construction by providing builders with practical solutions to



2×6 wall framing package.

construction of high-performance walls that (1) can be readily implemented in the field using available methods and materials and (2) can withstand the test of time from environmental and structural loads.

### Approach

Information in the Builder's Guide will be presented in a builder-focused format that includes the level of detail sufficient to enable builders to initiate transition of their construction practices, including minimum

code requirements, best practices, and 3D graphics showing various construction options. Information will be based on the latest building science, materials available in the market place, and new building codes. Development of the Builder's Guide is a collaborative effort with support from the Department of Energy's Building America Program and private industry. Key industry stakeholders are actively engaged in shaping the direction for the Builder's Guide and in the review of the document.

### **Expected Outcomes**

The first installment of the Builder's Guide will focus on two primary wall systems: (1) 2×6 walls with optimized framing and (2) 2×4 walls with up to 1.5 in. exterior foam insulation, each focusing on aspects most relevant to the transition to high-performance homes. Builders and designers are the primary expected audience searching for standardized solutions to energy-efficient construction. These two wall systems are selected because they represent mainstream energy-efficient options that use standard materials, require a minimal learning curve, are adaptable to system solutions, and contain construction cost implications.

The scope of the Builder's Guide will include all key performance and construction features applicable to transitioning to high-R walls, including (1) optimized framing, including new solutions such as rim headers; (2) cavity insulation; (3) exterior insulation; (4) air sealing; (5) moisture characteristics; (6) cladding attachments; (7) window and door installation; (8) detailing; and (9) whole-house considerations. The developed solutions will be primarily applicable to Climate Zones 3–5.

### **Timeline**

This effort was initiated in April 2015. A draft of the Builder's Guide with both wall systems will be available in mid-2015; the final document will be available early 2016.

### **Cooperators**

USDA Forest Service, Forest Products Laboratory  
Home Innovation Research Labs

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