NEWS RELEASE

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WOOD-FRAME HOUSES BETTER FOR ENVIRONMENT, RESEARCH SHOWS
Wood Uses Less Energy, Results in Fewer Greenhouse Gasses than Alternative Materials

Houses constructed with wood framing consume less total energy during their "lifetimes" than similar homes made with steel or concrete, according to a preliminary task force report by researchers from a dozen U.S. universities and U.S. and Canadian research organizations. The researchers analyzed the total energy used to manufacture and transport building materials, build a house, maintain it for a 75-year life-cycle, then demolish or dispose of it.

The analysis, called a life-cycle assessment (LCA), used sophisticated computer software to study four typical houses: a wood-frame and an identical steel-frame house in Minneapolis, and a wood-frame and an identical concrete-frame house in Atlanta. The Minneapolis houses were based on a 2,100-square-feet design with a basement. Both Atlanta houses used a 2,200-square-feet design on a concrete slab. All the houses complied with local building codes.

The researchers also calculated emissions of carbon dioxide, methane and nitrous oxide generated during the life cycles of the houses to determine the potential of different construction materials to impact climate change. Carbon emissions associated with energy use represented one of the more important environmental impacts, the report says.

In the first phase of the ongoing study, the researchers determined that construction of a typical Minneapolis steel-frame house would use 17 percent more energy than building an identical wood-frame home. The study's typical Atlanta concrete-frame house used 16 percent more energy than a matching wood-frame house.

The researchers also estimated the global-warming potential of the steel-frame home to be 26 percent greater than that of the wood-frame home; greenhouse emissions of the concrete-frame home were 31 percent greater than those of the comparable wood-frame home.

Several materials other than wood are common to all the houses, such as glass for windows, gypsum for wall board and sheathing, asphalt roofing and concrete for foundations. Concrete products, for example, account for more than 70 percent of the mass of the hypothetical wood-frame and steel-frame houses. Glass, gypsum, asphalt, steel and concrete are energy-intensive and make up the largest percentage of the energy required for home construction.

Much of the energy needed to produce wood building materials, on the other hand, comes from by-products such as bark, sawdust and trim, thereby reducing the consumption of fossil fuels.

Energy that would be used for heating and cooling during the useful life of the houses was calculated separately.

The study is being conducted by the Consortium for Research on Renewable Industrial Materials, which was formed in 1996 by a number of U.S. universities and several research institutes to update and expand a 1976 study by the National Academy of Science of the energy implications of using renewable building materials. Information from the current study is slated to become part of a database for use by architects, engineers and the general public (see http://www.nrel.gov/lci/).

The current study was partially funded by the USDA Forest Service Forest Products Laboratory (FPL), which focuses on housing and other wood-utilization research and is home to the

Advanced Housing Research Center. Other funders included the U.S. Department of Energy, consortium members and private industry.

Using the least energy-intensive building materials – and recycling and reusing building materials – makes sense in light of the nation's concerns about energy, pollution and climate change, according to consortium president Bruce Lippke, who is professor of forest resources at the University of Washington.

Building 1.7 million houses of wood, steel and concrete consumes roughly 850 million gigajoules of energy annually—comparable to the energy used to heat and cool more than 10 million homes, Lippke said.

"Everything kind of flows from energy consumption," Lippke said. "If you're using energy, you're polluting water, polluting air and kicking out carbon dioxide emissions."

With better material selection and house-construction design the energy use could be reduced substantially. The report suggests other opportunities that could substantially reduce the energy demands of home construction including:

- Redesign houses to use fewer fossil-fuel intensive products
- Change building codes that result in excessive use of wood, steel and concrete
- Recycle demolition wastes
- Increase durability of homes through improved products, construction designs and maintenance practices.

A 12-page summary of the report, published earlier this year in the Forest Products Journal, and the full report are available through the consortium's website at: http://www.corrim.org/reports/.

The USDA Forest Service Forest Products Laboratory, located in Madison, Wis., was established in 1910 with the mission of conserving and extending America's wood resources.

Today, its research scientists explore ways to promote healthy forests and clean water, and to improve paper-making and recycling processes. Through the Advanced Housing Research Center (http://www.fpl.fs.fed.us/ahrc/welcome.htm), FPL researchers also work to improve homebuilding technologies and materials

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