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STUDY INDICATES WOOD IS MOST "GREEN" BUILDING MATERIAL

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CORVALLIS, Ore. – A new report concludes that wood is one of the most environmentally-sensitive building materials for home construction – it uses less overall energy than other products, causes fewer air and water impacts and does a better job of the carbon "sequestration" that can help address global warming.

The research showed that steel framing used 17 percent more energy than wood construction for a typical house built in Minnesota, and concrete construction used 16 percent more energy than a house using wood construction in Atlanta. And in these two examples, the use of wood had less global warming potential, with steel at 26 percent more and concrete at 31 percent more.

This $1 million study was prepared by the Consortium for Research on Renewable Industrial Materials, a non-profit corporation of 15 research universities. It was published in the Journal of Forest Products and is the first major update on this topic since a 1976 report by the National Academy of Science.

The type of information and data provided in this report may be increasingly useful as consumers and government agencies try to identify construction techniques and materials for homes and other structures that minimize environmental impacts, said James Wilson, a professor of wood science and engineering at Oregon State University, and vice president of this research consortium.

"There's a significant consumer movement and even some voluntary standards that are interested in green, or environmentally conscious construction methods," Wilson said. "We need to have a good understanding of the overall effects that different types of construction have in such areas as energy consumption, global warming, air and water impacts, or solid waste disposal."

California and some other states are already moving towards "environmentally preferable purchase" standards that identify the best materials to use for energy conservation, environmental protection and other issues, Wilson said. And it's quite possible that some states or localities may legally require such approaches in the future for construction of public buildings, he said.

After some experimentation with new building approaches such as concrete or steel in recent decades, Wilson said, it appears that for environmental purposes we may return to one of the most ancient, tried-and-true materials of them all – wood.

"We've seen a general substitution for wood in many aspects of home construction for years, using less of it for siding, windows, roofing, other purposes," Wilson said.

"Price and availability of wood were some of the factors involved, along with building codes," he said. "And about five years ago the steel industry began a big push for more use of steel in home construction, which didn't accomplish as much as that industry hoped for, but did have some impact."

The new study that was done looks at the total “life-cycle assessment” of different construction products and techniques, considering such issues as how materials are grown, mined, processed, produced, used and ultimately disposed of, to give a better picture of their overall impact on the environment. It considers effects on energy use, air and water emissions, global warming and other topics.

Although many people are not aware of their overall makeup, houses require a broad range of natural resources, such as limestone, clay, iron ore, sand, gypsum, wood fiber, resins, coal and more. The process of building them uses energy in the form of electricity, diesel fuel, gasoline, wood, coal, or nuclear power. The cumulative impact of using all these natural resources and energy can be significant in ways that are not always apparent – everything from the electricity used in running a steel mill to the mining of raw materials or the diesel fuel that powers a truck hauling logs.

Compiled in a database, this type of information can help consumers, builders, architects, policy makers or government regulators make more informed choices, Wilson said. This particular project examined the implications of a wood frame housing design versus a steel frame design for the cold Minneapolis region, and a wood frame versus concrete design for the hot, humid Atlanta area.

In the Minneapolis example, steel framing, compared to wood, used 17 percent more energy; caused 26 percent more global warming potential; caused a 14 percent higher level of air emissions of concern; more than 300 percent, or triple the level of water emissions of concern; and had about the same solid waste disposal impact.

In the Atlanta example, concrete construction, compared to wood, used 16 percent more energy; caused 31 percent more global warming potential; caused a 23 percent higher level of air emissions of concern; had the same impact on water emissions of concern; and created 51 percent more solid waste.

Wood had a particular value in addressing the global warming issue, the data indicate. The growth of wood in renewable forests works to “sequester” and remove carbon from the atmosphere, and fewer carbon emissions are created in the processing needed to produce wood products than their steel and concrete counterparts.

The report also suggested ways to redesign houses to lower fossil fuel use, reduce the use of excessive amounts of materials, recycle demolition wastes and other improvements.

In continued research, Wilson said, scientists hope to expand their studies of wood and other types of construction materials as they relate to even more environmental issues. It will consider more housing examples, different regions of forest resources and manufacturing, use of resins and other structural products that play a role in house construction.

The database created in this study will be freely available to anyone, researchers say. More detail on the study can be found on the Web at www.corrim.org