# Thermal Mass Benefits of Log Homes Recognized

The nation's Model Energy Code finally recognizes the energy-conservation benefits of thermal mass. After 13 years, the LHC's claim a log wall's thermal mass makes it as energy efficient as a well-insulated frame wall has been acknowledged. The situation could be cause for adopting an "I told you so" attitude, but that won't happen. "The Log Homes Council (LHC) doesn't feel smug, it just feels vindicated," says Barbara Martin, LHC's executive director.

The situation in question is the fact the nation's Model Energy Code finally recognizes the energy-conservation benefits of thermal mass. This is a victory for the LHC. After 13 years, its claim a log wall's thermal mass makes it as energy efficient as a well-insulated frame wall has been acknowledged. Achieving this acceptance has been a major goal for the LHC, a part of the Building Systems Councils of the National Association of Home Builders (NAHB).

While the claim is true, it wasn't officially acknowledged, in part because thermal mass is difficult to quantify. Log homeowners had the home heating bills to prove it was true, but Department of Energy and code officials needed more than empirical evidence. So, over the past 13 years, the LHC has gathered scientific statistics from independent research projects to substantiate its assertion.

Now that it has succeeded, Dave Carter, LHC energy committee chairman, says "This makes life easier for log home producers. We no longer have to fight energy codes based on R-values. It also helps log homeowners. They don't have to invest in additional building materials to meet codes that do not improve the livability of their homes."

R-value measures a material's resistance to the transfer of heat from one side to another. Logs have a relatively low resistance to heat transfer. In fact, they actually absorb and store heat in their cellular structure. This put logs at a serious disadvantage in the cold winter states. It forced producers to overbuild their homes, especially their floor, window and roof systems, to meet total R-value requirements. "This drove up construction costs without any measurable benefit to our buyers," says Carte r.

R-values have been at the heart of the debate all along. When the energy crisis struck in the 1970's, the state and federal governments quickly developed new energy standards for residential construction. To assure compliance, officials needed a way to me assure the energy performance of all residential building materials. Since the situation was a crisis, and the R-value methodology existed, it became the standard.

Thermal mass is a material's capacity to absorb, store and slowly release heat over time. Logs do this well. The LHC set out to prove two things. First, logs have thermal mass because of their cellular structure, bulk and thickness. Second, this thermal m ass provides significant energy-saving benefits because it releases heat back into the house when temperatures drop.

Early studies proved thermal mass properties significantly reduce heating and cooling loads in moderate climates. The National Institute of Standards conducted the most important of these studies for HUD in 1981-82. However, energy experts continued to question the value of thermal mass during the winter months in northern climates. They doubted its benefit when heat is needed constantly and thermostat settings are opposite outdoor temperature.

Two recent studies, both conducted in cold climate states, answer this question to the log home industry's benefit. In 1990, an independent testing agency, Advanced Certified Thermography, conducted a study for the Energy Division of the Minnesota Department of Public Service. It focused on heat loss through air leakage, assumed to be a problem with log walls because of their many joints. The study found the industry has substantially reduced air infiltration rates in the past 15 years. It credited this reduction to improve joint construction and the use of expanded foam sealants and gaskets on all joints and corner intersections. Leakage in the 23 test homes occurred where it in the same places it does in frame houses: at the peak of the cathedral ceilings, around window and doorframes and along the tops of walls. The study concludes air leakage in well-built, modern log homes is not due to their log walls.

NAHB's Research Center conducted the second study for the LHC in 1991. It showed the thermal mass of log walls does significantly reduce energy use for heating in cold climates. It based its conclusion on a comparison of the actual energy use of eight log homes to the actual energy uses of eight well-insulated foam houses during one winter. The numbers of houses were evenly divided between upstate New York and Montana. The study also compared the homes actual energy use to their predicted energy consumption. The results led to the conclusion that log homes were as energy efficient as the frame houses.

"What is significant here is the log walls' average R-values was 44 percent lower than the frame walls' average R-value." says Carter. "Clearly, we must conclude the thermal mass performance of log walls is an advantage to log home owners."

Energy efficiency is just one of the many topics covered in "An American Dream, the Log Home," LHC's consumer booklet. This 15-page, four-color booklet presents a complete review of log home living as a lifestyle. For a copy and a list of log home producers, send a $3 check or money order to: Log Homes Council, National Association of Home Builders, 1201 15th Street, NW, Washington, DC 20005.

More than 50 of the nation's leading log home producers belong to the LHC. It works to improve industry standards, increase awareness of log construction as a method for building attractive homes and overcome obstacles to log home ownership.