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The House that Heats and Cools by Design

WAKE FOREST, NORTH CAROLINA

Michael Sykes is a forest products engineer, working in the heart of the Tar Heel State. The name Tar Heel comes from nickname for the workers who harvested the sticky paraffin-like resin of the Southern Yellow Pine tree. Sykes has found a way to once again take advantage of this abundant, premium product and have a positive environmental and economic impact.

Southern Yellow Pine lumber once dominated the homebuilding market as wood for framing. Since a house's framing is hidden, builders looking to cut costs have migrated to cheaper lumber such as Canadian spruce and fir. Yet, Southern Yellow Pine has one unique property that Canadian lumber does not- high resin content. This resin was also once a major export of the North Carolina economy.

Sykes' innovation is to use Southern Yellow Pine (SYP) lumber as a medium for energy storage. He has developed and patented technology to pass energy in and out of the wood, using the sun as the primary energy source. That sticky, Tar Heel resin can store lots of energy. Scientists have known this for years- but all the applications for the resin have involved removing it and using it as a type of glue in gypsum board. Southern Pines, planted by the millions under government programs in the 1970's and '80's, and now perfect for home-building, are unfortunately being used for lower value applications. In an Enertia® home, SYP lumber is a premium raw material once again, because of this resin.

The structure of the house does double-duty. Thick, SYP timbers are milled to look like siding on the outside, and paneling on the inside. The timbers take the place of siding, studs, sheeting, insulation, and interior wallboard. All these stages of construction become one step as each solid timber is placed and secured. The resulting structure has much greater mass than a stick built home. The major benefit of this mass- in addition to the thermal storage capacity- is unequalled strength to combat harsh, even devastating, weather.



The Enertia® envelope in action

From the outside the homes look like traditional wood sided homes, constructed on a full basement with lots of windows on the South. These windows capture heat during a winter day, when the sun is low on the horizon, and store that heat in the SYP walls. The pine then slowly releases the heat at night. During a summer day, the sun is higher in the sky, enabling most of the sunlight to be shed by the insulated roof. The sunlight which does enter the southern exposure- called passive solar gain- pulls cooled air from the basement, enveloping the house in a barrier of tempered air. The result is a house that heats and cools by design, rather than energy-intensive mechanical systems.



An Enertia home in western North Carolina

Over their lives, conventional homes that use these mechanical systems also create tremendous amounts of pollution. Reductions in energy consumption mean reductions in the pollution created by burning coal and natural gas to generate electricity. According to US DOE numbers, heating and cooling account for 55% of the energy used in our homes. Eliminating almost all of this consumption- through building a home that heats and cools by design- saves between four to five tons per year of CO₂ emissions alone.

The end result is a beautiful, new use for local forest products that benefits multiple partners. The mill gets top dollar for its wood, the customer gets a storm-resistant, ultra-efficient house, the builder reduces their overhead by eliminating 85% of the finish carpentry required for a stick-built home, and our planet gets a break on Greenhouse Gas and other emissions.



An Enertia® home under construction in central North Carolina

To see more on the science and technology of Enertia® Homes, please visit <http://enertia.com> and go to the Science section.