

solid, a liquid, or a gas. In all of its forms – ice, rain, and vapor – water can be a challenge to control in a building.”

Time Warp

Worse, the book contains more than its share of out-dated, misleading, and just plain inaccurate information.

Some errors are relatively minor, such as a misleading drawing in an illustration of the three mechanisms of heat transmission. (“Conduction” and “radiation” are reasonably represented by a stovetop cooking pot and open fireplace, but the “convection” drawing depicts hot air blasting from a hair drier, rather than a convective loop.) Nor is it a major problem that the authors use the terms “tarpaper,” “tar paper,” and “asphalt felt” interchangeably throughout the text, or that they mistakenly believe that all solid lumber 2x12s come, “by definition,” from old-growth trees.

Others, however, are more serious. The book discusses two possible approaches to retrofit insulation of basement walls. The suggestion that builders glue and nail pressure-treated 2x2s to the concrete foundation walls and fill the spaces between with rigid foam falls well short of best practice. But the second alternative offered – that the builder:

“... use 2 x 4s to build a conventional wall, usually insulated with fiberglass batts. If this is the approach, the sole plate should be pressure-treated and a vapor barrier should be applied to the inside of the framed wall....”

clearly belongs to another century.

Homes for a Changing Climate: Passive Houses in the US

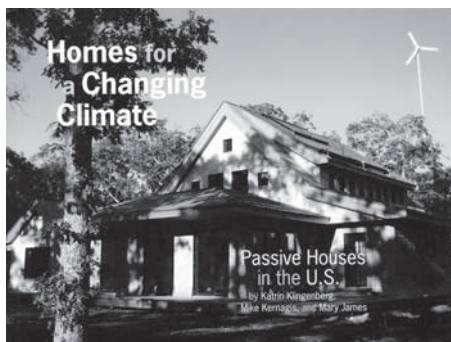


Figure 7. This new resource provides an excellent introduction to Passive House design and construction.

Mike Kernagis, and Mary James know their subject would be an understatement: Klingenberg and Kernagis are co-founders of the Passive House Institute United States (PHIUS), and have worked closely with

Homes for a Changing Climate is a compact, tightly constructed book that provides a superb introduction to Passive House design and construction (Figure 7). To say that authors Katrin Klingenberg,

A similar feeling of wandering into a building-science time warp pervades the book’s discussion of advanced framing techniques, which extols two-stud corners and walls framed with 2x6s on 24-inch centers, rather than 2x4s on 16-inch centers. The authors even devote a full page to a 2004(!) study by production builder Pulte Homes, which concluded that such “advanced” 2x6 framing boosted whole-wall R-values from 9.4 to 15.2, saving \$1,117 dollars in framing lumber and \$293 in annual heating and cooling costs.

Wide of the Mark

To the authors’ credit, they do address insulation more thoroughly – and realistically – in a later chapter, along with such options as SIPs and ICFs.

As a homeowner-level primer on energy-efficient home construction, in fact, *Green from the Ground Up* isn’t bad at all. A general reader might benefit from its broad, if shallow, coverage of everything from foundations and framing through insulation, roofing, sheathing, and siding to interior finish options, HVAC, plumbing, and electrical. (Assuming, of course, that the hypothetical homeowner doesn’t attempt to insulate his or her own basement using the book as a guide.) Overall, though, this is a book that tries too hard to do too much, and ends up accomplishing little.

Green from the Ground Up: Sustainable, Healthy, and Energy-Efficient Home Construction (ISBN 978-1-56158-973-9), by David Johnston and Scott Gibbs, is available for \$24.95 from The Taunton Press, 63 South Main St., PO Box 5507, Newtown, CT 06470-5507. Tel: (203) 426-8171; Web site www.taunton.com.

Dr. Wolfgang Feist, one of the originators of the Passive House concept and founder of the Passivhaus Institut in Darmstadt, Germany. Dr. Feist himself wrote the book’s introduction, and third coauthor Mary James is the former editor and publisher of *Home Energy* magazine.

Design Principles and Solid Data

The ten-page first chapter is a concise discussion of the seven principles of Passive House Design: (1) superinsulate; (2) eliminate thermal bridges; (3) make it airtight; (4) specify energy or heat recovery ventilation; (5) specify high-performance windows and doors; (6) optimize passive-solar and internal heat gains; and (7) model energy gains and losses using the Passive House Planning Package (PHPP). The remainder of the book is a series of case histories of actual US Passive House projects. Each of the project chapters includes two informative sidebars – a “By the Numbers” chart that details

the completed structure's specific heating requirements, whole-house specific primary energy requirement, peak heating load, air tightness and area-to-volume ratio, and an extensive "Project Data and Specifications" chart.

Many readers will already be familiar with at least some of the projects discussed. Although there are thousands of Passive Houses across Europe, they're still few and far between on this side of the water, and limiting the book to projects in the US means that most have already received notice elsewhere, including the pages of *EDU*. For the same reason, most of the "for more information" boxes included in each chapter refer the reader to the Ecological Construction Laboratory (e-co lab) founded by Klingenberg. A three-page "Resources" section in the back of the book provides contact information for Passive House architects, builders, and consultants nationwide.

Keeping an Eye on Costs

Still, collecting nine projects in one volume does draw attention to the variety of results attainable within the Passive House concept. They range from small, simple houses built for low-income first-time home buyers, to a sleek modern residence hall at a college language center, to a large luxury home in a traditional vernacular style. The case-history approach also makes it possible to examine how and why varied framing and insulation methods were used for each.

Throughout the book, the authors stress cost effectiveness and quantifiable performance over the soft-focus "environmental friendliness" so often emphasized elsewhere. They write:

"Finally, when comparing the costs of conventionally built homes and Passive Houses, there is a need to distinguish between costs associated with energy efficiency features and costs associated with green features. Energy-efficient construction costs less than building green. Insulation, the mainstay of efficient houses, is the cheapest material on site.... Construction costs for a house built to both Passive House and green standards will be significantly higher than for construction costs for a house built to Passive House standards alone."

High-End Projects and a Retrofit

Even so, several of the projects covered are hardly low-cost. The Waldsee Biohaus in Bemidji, MN, for example – the language-center residence hall – is partially insulated with extremely expensive vacuum insulated panels and sided with EIFS. (It also marks the authors' only – and brief – foray into architect-speak,

in a section that explains the building's three German-inspired themes of *Durchblick*, *Ausblick*, and *Einblick*.)

The 4,500 square-foot Cleveland Farm on Martha's Vineyard is a single-family residence that's described, rather oddly, as an "egg farm." (Its owners, we're told, have 65 chickens.) It demonstrates the feasibility of building even a spacious structure with projecting wings to the Passive House standard, and provides a cautionary example: Because the project wasn't originally conceived as a Passive House – the basic structure had been decided upon before PHIUS was brought in as a consultant – various design modifications were required that would have been far more efficiently included at an earlier stage.

And, while the Passive House concept has its origins in the moderately cold climate of central Europe, and is most often (although not necessarily) considered in terms of new construction, *Homes for a Changing Climate* stretches the concept to include a Berkeley, CA retrofit project and an experimental energy-efficient South Florida home. While the latter is not a true Passive House – the authors note that no US builder has yet attempted a certified Passive House in a demanding cooling climate – it's very much in the same spirit, and provides ample food for thought.

Missing Pieces

The book's shortcomings are relatively minor. Floor plans of the projects would have been nice, along with some additional elevation drawings. (On the only elevations included – for the visually complex Cleveland Farm – compass directions aren't labeled, leaving the reader to tease them from the text.) Although the book is short enough to get by without one, an index would have been a convenience. So would a glossary: Readers familiar with energy-efficient construction methods won't encounter any unfamiliar terms, but a homeowner or general reader might, and this book deserves to be read and understood by the widest possible audience.

Finally, the seven-manufacturer "Product Directory" – essentially an advertising supplement near the back of the book – is clearly less about informing the reader than partially subsidizing production costs. In a perfect world, those four pages would have been better used for something else. But, if that's what it took to get this excellent book published, it's a more than fair exchange.

Homes for a Changing Climate: Passive Houses in the US (ISBN 978-0-61522-740-5), by Katrin Klingenberg, Mike Kernagis, and Mary James, is available for \$25.00 from PHIUS, 110 S. Race St., Suite 202, Urbana, IL 61801. Tel: (217) 819-7988; E-mail: infor@passivehouse.us; Web site www.passivehouse.us.