

The Solar House: *Passive Heating and Cooling*

By Daniel D. Chiras

Reviewed by Rachel Ware & Johnny Weiss

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How do you design and build the ideal solar home? Clearly, your site selection, building design, materials choice, and lifestyle must all figure into the process. The choice to integrate passive solar strategies into a home design costs relatively little. Your heating and cooling requirements can be drastically reduced, saving money and increasing comfort.

The Solar House: Passive Heating and Cooling, by Daniel D. Chiras brings passive solar design out of the experimental 1970s and into modern residential design. It is comprehensive and up-to-date. No longer are we building "solar cookers" and roasting the occupants in discomfort. We are now able to integrate south-facing windows into a much larger system of passive solar techniques. Chiras calls it "natural conditioning."

The reasons for naturally conditioning your home with sunshine include comfort, economics, and sustainability. Chiras makes a strong case for passive solar design for each of these reasons. For the experienced building professional or the owner-builder, Chiras provides the design tools and building techniques to avoid common solar mistakes.

He wisely avoids prescribing one correct solar design. There are, however, certain strategies that every builder should pay close attention to, such as reducing air leakage. Dramatically reducing air drafts is as fundamental to good passive solar design as energy efficiency is to sensible PV system design. Chiras stresses that a quality building envelope, tight and super-insulated, is critical. After reading this 375 page resource, designers and builders will be

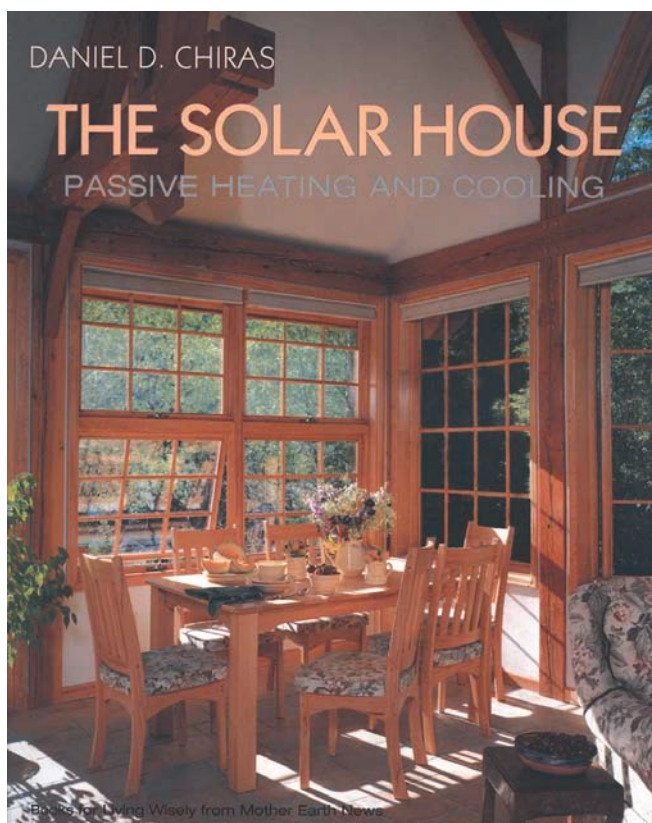
familiar with many of the different materials and technical solutions readily available to consumers.

Have you ever wondered how to optimize passive solar heating features so that they also promote passive solar cooling? Chiras' holistic approach does not separate these two comfort requirements. Heating and cooling needs are not competitive. Designing to insulate from the cold also reduces unwanted heat gain. The author says, "With foresight, careful planning, knowledge, and common sense, we can achieve comfort in virtually any climate, naturally, using sunlight, shading, earth sheltering, insulation, and natural daylight."

Chiras also recognizes the importance of how heat moves and how thermal mass contributes to occupant comfort. However, a more in-depth discussion of heat transfer (conduction, convection, radiation, and evaporation) would be helpful. Likewise, greater discussion of the relationship between thermal mass and mean radiant temperature would further help readers to appreciate the subtleties of building science and human comfort.

While we agree with the principles and fundamentals of Chiras' solar site analysis section, we occasionally use different terminology. For example, we refer to azimuth angles from true south, while he discusses bearing angles in reference to true north. This may confuse people. On the other hand, we feel the frank discussion of "lessons learned" from historic passive solar building is especially valuable.

Chiras lives in a successful solar home he designed and built, and is a wealth of firsthand information. We hope his



Incorporating passive solar features is better than a "free lunch." It's more like the "lunch you're paid to eat!" —Johnny Weiss

enthusiasm will inspire you to create the sustainable nest of your dreams. This is the fundamental up-to-date solar house book we've wanted to use as SEI's Solar Home Design workshop textbook for more than a decade.

Access

Solar House: Passive Heating and Cooling, by Daniel K. Chiras, 2002, paperback, 288 pages, ISBN 1-931498-12-1, US\$29.95 from Chelsea Green Publishing Company, PO Box 428, White River Junction, VT 05001 • 800-639-4099 or 802-295-6300 • Fax: 802-295-6444 • info@chelseagreen.com • www.chelseagreen.com

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