

Books

ENERGY INDEPENDENCE: YOUR EVERYDAY GUIDE TO REDUCING FUEL CONSUMPTION Christine Woodside, The Lyons Press, Guilford, CT, 208 pages, \$16.95, Dec. 2008, ISBN: 978-1-59921-528-4



Although the term "energy independence" is often used in the context of oil imports, author Christine Woodside is interested in the question of how we can each reduce our energy costs, especially with self-produced renewable energy.

Woodside, who is not an engineer, chose to investigate alternative energy technologies by interviewing people who are using these technologies. She

describes her own family's experience with a wood-fired boiler (which provides heat and hot water), and covers minihydroelectric plants, windmills and photovoltaic generators.

Woodside and her family — who live in a small town in Connecticut — slashed their heating bill with a combination of purchased, bartered and gathered wood. The book expands on the choices that one must make to pursue such alternatives at home; time and convenience must be traded for reduced fuel costs. Woodside also discusses the challenges. In New England, for example, unmaintained wood stoves and boilers are a nuisance because of excessive particulate emissions. So, the technology is a tradeoff among costs, global warming emissions, convenience, and fineparticle pollution — a scenario that should be familiar to engineers who have dealt with industrial technology.

The book explains that the ability to operate personal hydroelectric power generators is limited to a relatively small number of possible sites, and requires specialized expertise in maintenance of the dam, hydraulic system, generator, etc. Similarly, personal windmills make sense only in specific geographic locations favored by consistent winds, and require access to specialized maintenance expertise.

The economics of photovoltaic generation depend in part on the number of hours per year of incident sunlight and, more importantly, on the size of state and federal subsidies. Payback periods seem to vary substantially, with many in the range of three to ten years.

By interviewing people who live with the systems described, Woodside brings credibility to her analysis. She shows the big picture — addressing the tradeoffs and maintenance requirements involved, and challenging the reader to find alternatives cheaper and more efficient than electricity for heating water and drying clothes. She described actions that each of us can take on our own initiative — none requiring the development of a consensus on a national energy policy.

My principal reservation about the book is that

Woodside's knowledge base is partly regional. She dismisses geothermal heat pump systems. These may also reduce energy costs and footprint, particularly in locations with a high water table where winter heating and summer cooling loads are similar. She also devotes a chapter to minor electrical appliances, which seems more about uncluttering the kitchen than reducing environmental footprint and saving money.

For future publications, I encourage the author to include more case studies of how people have retrofit energy efficiency improvements into their homes and lives. How have they enhanced passive solar features of existing homes? How are they promoting greater environmental awareness within their families? How best can we quantify environmental footprint issues for the general public?

Still, readers are likely to find this book thought-provoking, especially if they are interested in reducing energy costs or their environmental footprint — and preferably both.

> — Robert W. Sylvester, DuPont Engineering Technology

The Advanced Materials Revolution: Technology and Economic Growth in the Age of Globalization

Sanford L. Moskowitz, John E. Wiley & Sons, Inc., Hoboken, NJ, 255 pages, \$75, Jan. 2009, ISBN: 978-0-471-61526-2



Science, technology and business have converged to produce the advanced materials industry — one of today's most dynamic industries, and one that increasingly controls global technological progress as a whole. This book offers a comprehensive investigation of the emerging international advanced-materials industry and its impact on the world's industrialized and emerging economies.

The book begins by tracing advanced materials from the 19th-century introduction of vulcanized rubber and stainless steel to today's single-walled nanotubes and ultrathin films. It then illuminates the major differences in how the U.S. and the European Union (E.U.) perceive and carry forward the technology creation process, and what these differences mean for achieving national and regional competitive advantage in the 21st century. The book draws upon sources spanning from 1970 though 2007, as well as interviews and corporate and governmental documentation. Each section highlights critical perspectives on the rise of the international advanced-materials industry and its impact on the relative competitiveness of the U.S. and the E.U. It concludes by discussing how what has been learned about advanced materials in the West predicts the future competitive power of an emerging Asia.