most examples are based on Madison, Wisconsin, can be misleading when a technology is much better suited for a different climate. For instance the ice-maker–heat-pump storage system in Section 7.9 should have been illustrated with an application where heating and cooling loads are more nearly balanced. In some cases I would like to see references to the literature to show where certain models, figures, tables come from; e.g., in Section 3.5.5 a reference for the magic degree day formula, and in Chapter 11 a reference for the variation of fuel consumption with speed. The only explicit error that I have found is an obvious oversight in Fig. 12.4.8 (same intercept for all collectors, regardless of the number of cover plates).

To conclude I would like to complement the author on an admirable job. The book is highly recommended, both as a reference for practicing engineers, and as text for advanced undergraduate or graduate students.

Reviewed by:
A. Rabl
Center for Energy and Environmental Studies
Princeton University
Princeton, N.J. 08544

Energy Management Principles, by Craig B. Smith, Pergamon Press, 1981, 493 pages, hard cover price: $49.50, soft cover price: $29.50.

According to the author, "The purpose of this book was to delineate certain general principles of energy management, explain their basis in terms of basic engineering theory and fact, and then illustrate their use in a variety of situations. The audience for the book was considered to be senior, graduate, or practicing engineers or architects." Energy management is taken to include "load management, efficient end-use, fuel conservation, heat recovery, and more efficient processes and equipment."

The book is organized to clearly take the reader through the steps of an energy management program, with emphasis on programs in commercial buildings (not houses) and industry. Chapters 1–4 describe initial activities, including management commitment and identifying the principles of energy management. These principles, as listed in Table 3.2, start with a review of energy use data and energy audits, continue on to housekeeping and maintenance, follow with an elaboration of the major elements of energy management cited in the foregoing, and conclude with economic evaluation.

Guidelines for building and site energy audits are discussed in Chapter 5. This chapter, like many that follow, does not include sufficient technical material to fully train someone to identify or correct energy management problems. But it serves a valuable role at the supervisory level, by listing important survey items (HVAC, boiler and steam lines, material transport, furnaces and ovens, to name a few) and providing sample survey forms and lists of appropriate instrumentation. The author also includes a table of "energy management opportunities," a very general list that helps answer the question of "have I overlooked any major routes to reduce energy use?" For steam systems, for example, the opportunities include preheating feedwater and combustion air, insulating lines, and recovering stack heat.

Chapters 6–12, the "problem solving" section of the book, provide the reader with information needed to understand and quantify the general principles and opportunities identified in the first five chapters. The chapters cover, among other topics, heating and cooling, electrical loads and lighting, and process energy. Each chapter is well organized and written, and includes tables of general principles (optimize HVAC capacity; do not condition unoccupied spaces; employ heat recovery) and a section on specific energy management opportunities ("a 5°C reduction in condensing temperature can save 10–20 percent on chiller energy use.") The reader will not learn how to perform a first or second law analysis of a chiller, but will see a pressure-enthalpy diagram and learn of possible improvements on each leg of the thermodynamic cycle.

These chapters include many excellent tables which make the book a valuable reference. Table 8.13, for example, compares incandescent light sources with such alternatives as fluorescents, mercury vapor, metal halide, and high-pressure sodium and provides wattage, lifetime, and output. Table 12.5, in the chapter that focuses on economics, is a succinct summary of the formulas used in economic analyses.

The book concludes with tips for assessing and sustaining an ongoing energy management program, and for applying the same principles used for buildings and industry to cities as well. Appendices include conversion factors, energy content of fuels, and power and energy measurement techniques.

For the practicing engineer or architect involved in energy management, this book is an excellent guide and reference. As a text for students, it should not be used alone, but could well supplement material found in more fundamental treatments of thermodynamics, HVAC equipment and electrical systems.

Reviewed by:
Les Norford
Center for Energy and Environmental Studies
Princeton University
Princeton, N.J. 08544

Wind Power Plants – Theory and Design, by D. LeGourieres, Pergamon Press, 1982, 285 pages, price: $28.00.

The realization that fossil fuel supplies are not inexhaustible and that the use of these fuels can cause environmental damage has created an interest in the use of renewable energy sources. Among these renewable sources, wind energy appears to have the greatest potential for producing high-grade energy at a reasonable cost.

The apparent simplicity of wind power devices is, however, quite misleading. While it is very easy to extract some energy from the wind, it is very difficult to extract large amounts of energy at an acceptable cost.

Wind Power Plants – Theory and Design gives an insight into some of the problems of extracting wind energy. It describes the characteristics of the natural wind, the theory of the design of wind power plants, and describes some of the important parameters. The book also describes many of the solutions that have been used to solve the problems.