

Book reviews

Fueling Our Future: An Introduction to Sustainable Energy, R.L. Evans. Cambridge University Press, Cambridge, UK (2007). 192 pp., price: US\$ 24.99, ISBN: 978-0-521-68448-4, paperback

“One of the most important issues facing humanity today is the prospect of global climate change, brought about primarily by our prolific energy use and heavy dependence on fossil fuels.” Coincidentally, this review is being written the day former U.S. Vice President Al Gore received a Nobel Prize for his focus on global warming problems.

And the problem is increasing due to increasing energy use, especially in developing countries. For example, energy use is increasing by 4% per year in China, by 6% per year in India and by 2% per year in the world.

In this book, the author “. . .takes a systems approach to energy use, so that the complete consequences of choosing a particular energy source or energy conversion system can be seen.” Discussed in depth (in a non-mathematical fashion) is the current state of the art of sustainable energy technology including non-conventional fossil fuels and such renewable energy sources as nuclear power (this power source is discussed not because of its sustainable relativity but because it produces no greenhouse gases when employed to produce electricity).

Carbon dioxide concentrations have risen from 270 ppm in pre-industrial time to almost 370 ppm today. At the same time, the earth’s temperature has risen approximately 1 °C. Future significant increases are predicted for both carbon dioxide concentration and temperature if carbon dioxide controls are not initiated.

Energy use in all its forms is increasing. The source of most energy production today is fossil fuels which are declining in supply, especially crude oil and natural gas, which along with coal supply 80% of the world’s energy needs; nuclear power supplies 7%.

There is little doubt that large-scale utilization of fossil fuels is putting significant stress on the environment according to the author. Simultaneously, these fuels are being irrevocably consumed and in the process produce air-contaminating byproducts such as particulates, SOX, NOX, CO and CO₂.

In the section of the book entitled “The global energy demand and supply balance,” there are the following two chapters: (1) World energy demand and (2) World energy supply. Demand, Evans notes (not surprisingly), is rising. Currently, approximately 25% of all energy is used for transportation and 32% for

industrial production (the amount varies by country depending upon the degree of industrialization).

The energy source for the world’s consumption is reported to be as follows: oil 35%, coal 24%, combustible renewables and waste 11%, hydro 2%, nuclear 7% and natural gas 21%.

The rest of the book is devoted to the author’s main goal which is a focus on new and sustainable energy sources—a topic which I believe is more critical than the concern for global warming. Evans writes, “There is a need, therefore, to develop new or ‘non-conventional’ sources of fossil fuels to supplement the traditional crude oil supplies.”

This source, in the short term, will be oil sands or oil shale and coal-bed methane. Carbon sequestration may well be utilized to control carbon dioxide emissions. But in the future, one should expect contributions by low density sources such as wind, solar, biomass (wood), landfill gas, ocean waves, and geothermal.

Nuclear technology is covered, albeit briefly, in Chapter 8 not because (as noted previously) it is a renewable energy source but because it produces no carbon dioxide and is a high-density energy provider. The final two chapters discuss the transportation challenge. New and exciting energy use reduction efforts are described such as fuel cell and hybrid electric vehicles which will reduce the need for petroleum fuel.

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Industrial Enzymes: Structure, Function and Applications, J. Polaina, A.P. MacCabe (Eds.). Springer, Dordrecht, The Netherlands (2007). 653 pp., Price: US \$179.00, ISBN: 978-1-4020-5376-4

“Man’s use of enzymes dates back to the earliest times of civilization. Important human activities such as the production of certain types of foods and beverages, and the tanning of hides