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Book Review

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Gasoline, Diesel, and Ethanol Biofuels from Grasses and Plants

Ram B. Gupta and Ayhan Demirbas, Cambridge University Press, New York, 2010, 230 pp., $75

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Recent environmental and economical concerns related to fossil fuel depletion have redirected how the world produces energy for commercial and residential use. Renewable fuels are receiving considerable attention because they are sustainable media and, when used to produce energy, typically have lower pollution output. The authors have written a very timely book on the sources, uses, and advantages of biofuels. The book begins with a general review and history of fossil fuels, their current status, and their projected future use and availability. Compiled is an unbiased account of the pros and cons of all known fuels, their costs, environmental impacts, and reserves. With this in mind, Gupta and Demirbas bring to focus the importance of second-generation biofuels obtained from nonfood biomass as a viable energy source for the future.

The first chapter reminds the reader that the earliest use of biomass was in the form of wood for heating, dating back 10,000 years. Of course, the energy output was not efficient and was replaced by high energy density fossil fuels during the Industrial Revolution, which has been responsible for our persistent use of fossil fuels today. Issues related to global warming, air pollution, fossil fuel reserves, and rising fuel prices have motivated new approaches and stimulated older technologies to be at the forefront of our eminent fuel issues. Renewable energy resources, as outlined in chapter 3, have always been a part of our society, although their use diminished with the use of coal and petroleum.

Notwithstanding the prominence and diversity of biomass resources, society has yet to fully take advantage of the potential energy that can be derived. First-generation biofuels, specifically ethanol, have been around for centuries and only received considerable attention in the mid-1990s. As discussed in chapter 5, the demand and use of ethanol is expected to double in the next 10 years. However, the production of ethanol is still controversial, with concerns for the impact on food prices and associated costs to produce the fuel, especially from corn.

The remainder of the book presents an inclusive discussion on second-generation fuels derived from biomass sources such as agricultural residue, switchgrass, corn stover, and waste wood, to name a few. I found the details of these chapters to be insightful, as the authors introduce the readers to biodiesel and bio-oils, and the methods by which these fuels are produced. The reader will gain useful knowledge on all considerations for how these fuels can be improved and the great potential they have to help with the energy crisis projected for the future.

The book is ideal for anyone interested in a general understanding of biofuels, and it is suitable as supplemental class material for those teaching an introductory course that includes alternative energy topics. The level of reading is reasonable for those who are satisfied with a glossary explanation of the sciences involved. The text includes historical facts and brief technical discussions to present the considerable breadth of the field of biomass fuels. Both tables and figures will help the reader summarize the important statistics and gain a basic appreciation for the field, thus stimulating further interests that can be addressed by more advanced textbooks. In summary, I found that this book provides a comprehensive perspective on future challenges that society needs to consider in order to balance and efficiently use our energy resources.

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