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Book review

Thermal Energy Storage: Ibrahim Dincer and Mare A. Rosen
John Wiley & Sons, Ltd. 2002

This book is a stop-gap in the field of energetics, summarizing the latest technologies of energy storage. The storage of energy becomes more and more important from the point of view of energy saving and environmental issues. The worldwide increasing role of renewable energy sources appreciates different types of energy storage systems.
This book is well-structured. It is valuable not only for practicing engineers, but also for undergraduate and graduate students. The book primarily proves to be successful to understand the operation of thermal energy storage (TES). After a brief overview of general aspects of thermodynamics, basic fluid mechanics, and heat transfer, the following chapters discuss energy storage technologies, environmental aspects of TES, thermodynamics optimalization, energy and energy analyses of TES systems.
All chapters have a similar structure in order to make understanding easier.
The book starts with a general introduction into thermodynamics, fluid flow and heat transfer, defining the fundamental issues and physical parameters.
Chapter 2 gives an overview of different energy storage systems, discussing the stage of their development, their significant benefits and their main advantages.
The next chapter deals with the methods of thermal energy storage (TES). As it is presented, TES provides a potentially economic means of using waste heat and climatic energy resources. These types of storages can be considered advanced energy resources. These types of storages can be considered advanced energy technology. It is essential, especially for solar thermal applications, because of fluctuations in solar energy input.
The environmental impacts – focusing on acid precipitation and greenhouse effect – are comprehensively discussed in Chapter 4. The thermal energy storage (TES) systems are prosperous solutions to several types of environmental problems. Besides, TES can be successfully applied also to energy saving techniques.
In Chapter 5 the reader is introduced the substantial energy saving techniques, which are completed with interesting case studies.
After the presentation of TES as an energy conservation and management tool, the next chapter focuses on the problem of sensible heat storage in liquids. Special attention has been paid to stratified TES for hot or chilled water fluids, because they have become a common tool in energy conservation and management technology. Theoretical and experimental foundations of stratified TES are well-reviewed.
Another type of heat storage is presented in Chapter 7. The modelling of latent heat storage systems are more complex than sensible heat storage systems. The chapter, in gen-

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eral, is an overview of the most common modelling techniques for predicting heat transfer and thermal behaviour of lantent heat TES systems.
Chapter 8 deals with a special field of energy storage, namely with energy storage in the from of latent heat of phase transition. Important engineering applications can be found in bioengineering, thermal science area, material science and food processing industries. Theoretical background of heat transfer with phase change is presented in simple and complex geometries.
The next chapter introduces the thermodynamic optimalization of TES systems discussed in the previous chapters. Chapter 10 demonstrates that the use of energy analysis develops a good understanding of the thermodynamic behaviour of TES systems. The energy analysis takes into account the loss of availability and temperature of heat in storage operations. Through illustrative examples a better understanding is provided. Finally, in Chapter 11, a big number of case studies are drawn from reports in literature.
All demonstrated TES systems and their applications comprehensively illustrate the different ways how TES is an efficient and effective way of storing thermal energy. In short, this book is indispensable for practicing engineers and students being active in energy engineering.

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