1. Record Nr. UNINA9910824948403321

Autore	Kalogirou Soteris A
Titolo	Solar energy engineering : processes and systems / / Soteris A. Kalogirou
Pubbl/distr/stampa	Oxford : , : Academic Press, , 2014
ISBN	0-12-397256-6
Edizione	[Second edition.]
Descrizione fisica	1 online resource (xx, 819 pages) : illustrations (some color)
Collana	Gale eBooks
Disciplina	841
Soggetti	Solar energy Engineering
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	First edition 2009.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Front Cover; Solar Energy Engineering: Processes and Systems; Copyright; Contents; Preface; Preface to Second Edition; Chapter 1 - Introduction; 1.1 General introduction to renewable energy technologies; 1.2 Energy demand and renewable energy; 1.3 Energy-related environmental problems; 1.4 State of the climate; 1.5 A brief history of solar energy; 1.6 Other renewable energy systems; Exercise; References; Chapter 2 - Environmental Characteristics; 2.1 Reckoning of time; 2.2 Solar angles; 2.3 Solar radiation; 2.4 The solar resource; Exercises; References; Chapter 3 - Solar Energy Collectors 3.1 Stationary collectors3.2 Sun-tracking concentrating collectors; 3.3 Thermal analysis of flat-plate collectors; 3.4 Thermal analysis of air collectors; 3.5 Practical considerations for flat-plate collectors; 3.6 Concentrating collectors; 3.7 Second law analysis; Exercises; References; Chapter 4 - Performance of Solar Collectors; 4.1 Collector thermal efficiency; 4.2 Collector incidence angle modifier; 4.3 Concentrating collector acceptance angle; 4.4 Collector time constant; 4.5 Dynamic system test method; 4.6 Efficiency parameters conversion 4.7 Assessment of uncertainty in solar collector testing4.8 Collector test results and preliminary collector selection; 4.9 Quality test methods; 4.10 European standards; 4.11 Data acquisition systems; Exercises; References; Chapter 5 - Solar Water-Heating Systems; 5.1 Passive systems; 5.2 Active systems; 5.3 Heat storage systems; 5.4 Module and array design; 5.5 Differential temperature controller; 5.6

Hot water demand; 5.7 Solar water heater performance evaluation; 5.8 Simple system models; 5.9 Practical considerations; Exercises; References; Chapter 6 - Solar Space Heating and Cooling
6.1 Thermal load estimation6.2 Passive space-heating design; 6.3 Solar space heating and cooling; 6.4 Solar cooling; 6.5 Solar cooling with absorption refrigeration; Exercises; References; Chapter 7 - Industrial Process Heat, Chemistry Applications, and Solar Dryers; 7.1 Industrial process heat: general design considerations; 7.2 Solar steam generation systems; 7.3 Solar chemistry applications; 7.4 Solar dryers; 7.5 Greenhouses; Exercises; References; Chapter 8 - Solar Desalination Systems; 8.1 Introduction; 8.2 Desalination processes; 8.3 Direct collection systems
8.4 Indirect collection systems8.5 Review of renewable energy desalination systems; 8.6 Process selection; Exercises; References; Chapter 9 - Photovoltaic Systems; 9.1 Semiconductors; 9.2 Photovoltaic panels; 9.3 Related equipment; 9.4 Applications; 9.5 Design of PV systems; 9.6 Tilt and yield; 9.7 Concentrating PV; 9.8 Hybrid PV/T systems; Exercises; References; Chapter 10 - Solar Thermal Power Systems; 10.1 Introduction; 10.2 Parabolic trough collector systems; 10.3 Power tower systems; 10.4 Dish systems; 10.5 Thermal analysis of solar power plants; 10.6 Solar updraft towers
10.7 Solar ponds

Sommario/riassunto

As perhaps the most promising of all the renewable energy sources available today, solar energy is becoming increasingly important in the drive to achieve energy independence and climate balance. This new book is the masterwork from world-renowned expert Dr. Soteris Kalogirou, who has championed solar energy for decades. The book includes all areas of solar energy engineering, from the fundamentals to the highest level of current research. The author includes pivotal subjects such as solar collectors, solar water heating, solar space heating and cooling, industrial process heat, solar desalina