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Nota di contenuto	1. Thermal Structure of the Earth.-1.1 Renewable Energies, Global Aspects -- 1.2 Internal Structure of the Earth -- 1.3 Energy budget of the planet -- 1.4 Heat transport and thermal parameters -- 1.5 Brief outline of methods for measuring thermal parameters.- 2. History of Geothermal Energy Use -- 2.1 Early utilization of geothermal energy -- 2.2 History of Utilization of Geothermal Energy in the last 150 Years . - 3. Geothermal Energy Resources -- 3.1 Energy -- 3.2 Significance of "renewable" energies -- 3.3 Status of geothermal energy utilization -- 3.4 Geothermal energy sources.- 4. Application of Geothermal Energy -- 4.1 Near surface Geothermal Systems -- 4.2 Deep Geothermal Systems -- 4.3 Efficiency of geothermal systems -- 4.4 Major geothermal fields, high enthalpy fields.- 5. Potentials and Perspectives of Geothermal Utilization.- 6. Geothermal Probes -- 6.1 Planning Principles -- 6.2 Construction of ground source heat exchangers -- 6.3 Dimensioning and design of geothermal probes.- 6.4 Drilling methods for borehole heat exchanger -- 6.5 Backfill and grouting of geothermal probes -- 6.6 Construction of deep geothermal probes -- 6.7 Operating geothermal probes: Potential risks, malfunctions and damages -- 6.8 Special systems and further developments.- 7. Geothermal Well Systems -- 7.1 Building geothermal well systems -- 7.2 Chemical aspects of two-well systems -- 7.3 Thermal range of influence, numerical models.- 8. Hydrothermal Systems, Geothermal Doublets -- 8.1 Geology and tectonic structure of the underground --

8.2 Thermal and hydraulic properties of the target aquifer -- 8.3 Hydraulic and thermal range of hydrothermal doublets -- 8.4 Hydrochemistry of hot waters from great depth.- 8.5 Reservoir-improving measures, Efficiency-boosting measures, Stimulation -- 8.6 Productivity risk, Exploration risk, Economic efficiency -- 8.7 Some site examples of hydrothermal systems -- 8.8 Project planning of hydrothermal power systems.- 9. Enhanced-Geothermal-Systems (EGS), Hot-Dry-Rock Systems (HDR), Deep-Heat-Mining (DHM) -- 9.1 Techniques, procedures, strategies, aims -- 9.2 Historical development of the hydraulic fracturing technology, early HDR sites.- 9.3 Stimulation procedures -- 9.4 Experience and dealing with micro-seismicity -- 9.5 Recommendations, Notes.- 10.Environmental Issues Related to Deep Geothermal Systems -- 10.1 Seismicity related to EGS projects -- 10.2 Interaction between geothermal system operation and the subsurface -- 10.3 Environmental issues related to surface installations and operation -- 11. Drilling techniques for deep wellbores.
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Sommario/riassunto

The internal heat of the planet Earth represents an inexhaustible reservoir of thermal energy. This form of energy, known as geothermal energy has been utilized throughout human history in the form of hot water from hot springs. Modern utilization of geothermal energy includes direct use of the heat and its conversion to other forms of energy, mainly electricity. Geothermal energy is a form of renewable energy and its use is associated with very little or no CO2-emissions and its importance as an energy source has greatly increased as the effects of climate change become more prominent. Because of its inexhaustibility it is obvious that utilization of geothermal energy will become a cornerstone of future energy supplies. The exploration of geothermal resources has become an important topic of study as geology and earth science students prepare to meet the demands of a rapidly growing industry, which involves an increasing number professionals and public institutions participating in geothermal energy related projects. This book meets the demands of both groups of readers, students and professionals.