

1. Record Nr.	UNINA9910488727403321
Autore	Ocon Pawe
Titolo	Renewable energy utilization using underground energy systems // Pawe Ocon
Pubbl/distr/stampa	Cham, Switzerland : , : Springer, , [2021] ©2021
ISBN	3-030-75228-3
Descrizione fisica	1 online resource (182 pages)
Collana	Lecture Notes in Energy ; ; v.84
Disciplina	697
Soggetti	Underground architecture Heating Heat - Transmission
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Intro -- Introduction -- Contents -- Symbols -- 1 Renewable Energy Sources in Poland -- References -- 2 Storage of Thermal Energy in the Ground -- 2.1 Storage of Thermal Energy in the Tank Thermal Energy Storage Method -- 2.2 Storage of Thermal Energy in the Pit Thermal Energy Storage Method -- 2.3 Storage of Thermal Energy in the Borehole Thermal Energy Storage Method -- 2.4 Thermal Energy Storage in Reinforced Concrete Energy Piles -- 2.5 Storage of Thermal Energy in the Aquifer Thermal Energy Storage Method -- 2.6 Storage of Thermal Energy in the Cavity Thermal Energy Storage Method -- References -- 3 Solar-Assisted Heat Pumps -- 3.1 Solar-Assisted Ground Source Heat Pumps -- References -- 4 Zero-Emission Building Heating System Using Thermal Energy Accumulation in the Ground -- 4.1 Concept of the System -- 4.2 Components of the System -- 4.2.1 PVT Panels with a Sun-Tracking System -- 4.2.2 Demonstration Installation of a Zero-Emission System with Heat Accumulation in the Ground -- 5 Mathematical Modelling of the Resheat System -- 5.1 Thermal Properties of the Ground -- 5.1.1 Thermal Conductivity of the Ground-the Campbell-De Vries Model -- 5.1.2 Soil Specific Heat -- 5.2 Modelling the Building Heating System with Heat Accumulation in the Ground -- 5.2.1 Calculation of the Heat Pump Coefficient of Performance -- 5.2.2 A Mathematical Model of RESHeat System

with Heat Accumulation in Two Underground Tanks -- 5.2.3
Discretization of Energy Equation-Finite Volume Method -- 5.2.4
General Energy Balance Equations in the Cartesian Coordinate System
-- 5.2.5 Results and Discussion -- 5.2.6 Analysis of the Impact
of the Ground Thermophysical Properties on the Performance
of the Heat Accumulation System -- References -- 6 Resheat System
Optimization -- 6.1 PSO Method Algorithm -- 6.2 Calculation Results
-- References.
7 Modelling Heat Transfer in the PV Panel Cooling System -- 7.1
Numerical Modelling of the Temperature Distribution of PVT Panels --
7.1.1 Model of Heat Exchange in PVT Panels -- 7.1.2 PV Panel Energy
Balance Equation-The Cartesian System -- 7.1.3 PV Panel Energy
Balance Equation-The Cylindrical System -- 7.1.4 Discretization
of the Coolant Energy Equation-Finite Difference Method -- 7.2
Analysis of the Cooling System Operation -- References -- 8 Economic
Analysis -- 9 Advantages of the Resheat System Over Traditional
Solutions -- 10 Optimization of Underground Power Cable Systems --
10.1 Optimization Problem -- 10.2 Electric-thermal Model
of the Considered UTL -- 10.3 Thermal Conductivity
of the Computational Subdomains -- 10.3.1 Thermal Conductivity
of Cable Layers -- 10.3.2 Thermal Conductivity of the Soil and Backfill
Materials -- 10.4 Optimization Algorithm -- 10.4.1 Jaya Algorithm --
10.4.2 Modified Jaya Algorithm -- 10.5 Results and Discussion --
10.5.1 Performance Analysis of the Modified Jaya Algorithm -- 10.5.2
Material Cost Optimization and Thermal Performance Analysis
for a 400 kV ULT -- 10.5.3 Thermal Performance of Different Backfill
Materials Under Variable Loading -- 10.5.4 Thermal Performance
of the UPCS Under Various Soil and Backfill Thermal Conductivities --
10.6 Outline -- References -- Summary and Conclusions.
