Determining the Optimal Capacities of Renewable-Energy-Based Energy Conversion Systems for Meeting the Demands of Low-Energy District Heating, Electricity, and District Cooling - DTU Orbit (08/11/2017)

Determining the Optimal Capacities of Renewable-Energy-Based Energy Conversion Systems for Meeting the Demands of Low-Energy District Heating, Electricity, and District Cooling

This chapter presents a method for determining the optimal capacity of a renewable-energy-based energy conversion system for meeting the energy requirements of a given district as considered on a monthly basis, with use of a low-energy district heating system operating at a low temperature, as low as 55 °C for supply and 25 °C for return, and with additional considerations being directed to supply electricity and cooling. Several optimal solutions with various nominal capacities of the technologies involved were obtained in each of the two case studies, one being for the Greater Copenhagen Area, and the other for the Greater Toronto Area. Various climate conditions of the case areas in question caused different observations of nominal capacities for the energy conversion systems considered with single-production and multi-production based on different renewable energy sources.

General information

State: Published
Organisations: Department of Civil Engineering, Section for Building Energy , University of Ontario Institute of Technology
Authors: Tol, H. (Intern), Svendsen, S. (Intern), Dincer, I. (Ekstern)
Pages: 777-830
Publication date: 2015

Host publication information

Title of host publication: Progress in Clean Energy
Volume: 2
Publisher: Springer
ISBN (Print): 978-3-319-17030-5
ISBN (Electronic): 978-3-319-17031-2
Chapter: 53
Main Research Area: Technical/natural sciences
Renewable energy, Low-energy, District heating, Low-temperature, District cooling, Energy conversion system, Municipal decision tool, Exergoeconomy, Lifecycle cost, Optimization
DOIs:
10.1007/978-3-319-17031-2_53
Publication: Research - peer-review › Book chapter – Annual report year: 2015