Abstract:
The tool we are developing provides guidelines concerning building envelope and heating/cooling energy sources in order to increase energy efficiency of buildings by including the subject of energy consumption in the very early stage of building design. Building size and climate can be varied. To calculate the right mix of energy sources and conversion equipment that minimizes costs, energy or CO2 emissions numerous parameters concerning various space heating or cooling technologies need to be assessed. To perform multi-energy plant optimization we need to determine the upper boundary of thermal energy gained by solar collectors. Based on weather data and maximal available solar collector area, solar collector gains for different outlet temperatures can be simulated. For design purposes collector tilt angle has been optimized. The developed collector model has a very short calculation time and can easily be integrated into plant system model and its optimization. Due to its hourly resolution the simulated profile can be used for thermal storage optimization. We compared this simplified model with a more detailed one developed in Trnsys and obtained satisfying results.

Stichworte:
solar thermal collector, model, tilt angle, optimization, solar gains

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