

Subject:	Simulation of large collector fields
Description:	Overview and hints to make an accurate system simulation
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Introduction to simulation of large solar collector fields

Simulation is a very useful tool for design and sizing of a solar collector field. To get a good accuracy it is important to start with a load analysis and secondly to find accurate enough local weather data. Also a time resolution of at least hourly weather data is needed. The split into beam and diffuse radiation is also very important, to derive a good all-day simulation accuracy. Then of course the component models and accuracy of the input data is very important too. Below some hints are given to make a good collector field simulation.

Load Analysis

Here both energy and temperature requirements with at least monthly resolution is needed. Also near future expansions of the network has to be taken into account.

Weather Data

Accurate local weather data with at least 1 hour time resolution is needed. The split in beam and diffuse solar radiation is a significant advantage if available.

Component Models and Parameters

Well validated proven component models should be used. Models that match existing test standards closely, can be recommended. Then test parameters can be used directly without conversions.

System model setup

This part can be done on several levels of detail. Here experiences of simulation and especially previous system model validation, is very advantageous. It is important to find a balance between complexity and accuracy as high accuracy also requires a lot of extra inputs. If storages, heat pumps and cogeneration plants are present, the system model can get quite complex especially including the necessary control. But at the same time valuable, as the control strategy can be optimized for the whole plant.

References

For more details, see "Simulation of Large Collector Fields", IEA-SHC TECH SHEET 45.A.4, <http://task45.iea-shc.org/fact-sheets>