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Computer tools applied to analysis of solar water heaters

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The computer programs are important tools to analyze buildings and systems integrated in the construction. Through simulation, it is possible to evaluate the energetic performance of different design alternatives, such as architectural design, building materials, lighting system, air conditioning system and the use of renewable energy. Moreover, one could estimate the consumption and costs with energy and the environmental impacts. The objective of this article was to conduct a comparative assessment of different computer tools to analysis of solar water heaters in buildings, focusing on their abilities and their target audience. It was verified that the programs RETScreen International, EnergyPlus, TRNSYS, SolDesigner, T*SOL and SolarPro has long been used to evaluate the use of solar thermal systems. Among the tools mentioned, only the EnergyPlus and RETScreen International are free and they are designed for a diverse audience, including designers, researchers and energy planners. The first program has a module of detailed energy analysis of solar water heaters, while the second one has modules of economic feasibility of the system and greenhouse gas emissions analysis of easy to apply. The programs TRNSYS and SolarPro, such as EnergyPlus, provide a detailed energetic analysis and has long been used in scientific research. The softwares SolDesigner and T*SOL are more applied to the design of projects and generally used by construction professionals, including civil engineers and architects. Therefore, within the range of computer solar water heaters simulators currently available, it is necessary that the user know the tools specifications, such as programming language and capabilities so one may choose the program that is most suitable to produce the expected results for one's knowledge and modeling skills.

Keywords: simulation; solar energy; water heating; buildings