Solar Heating and Cooling system using seeback effect

ABSTRACT

The purpose of this project has been to investigate the possibility of heating and cooling water by connecting Peltier Elements to a PV panel. The idea was initiated by Energiteknik i Teckomatorp AB, a company that provides heat pumps and coolers to small scale businesses and private customers. The "climate panel" developed is to be used as a compliment to an existing heating system in order to pre-heat and pre-cool the air coming into the house. By decreasing the heating demand in winter and cooling demand in summer the panel could contribute to lowering the annual energy need and thereby save money. The aim of this project has been to investigate the potential for such a panel, and to perform an economic evaluation in comparison to common Swedish heating systems.

The result presented in this report is based on practical simulations. A prototype design has been developed along with the company and tested in their workshop. The results showed that the panel has an annual energy output of 1 300 kWh, which corresponds to 9% of the heating and 5% of the total energy need for a "normal" Indian house. The economic viability of the panel depend on which heating system it is used along with, and the pay-back time vary between 3- 10 years. There are many uncertainties connected to the theoretical model and the practical results and further testing is needed to fully evaluate the system. The conclusion is that there is great potential in developing this product, and that it can be used as a complement to an existing heating system to save both energy and money. Using solar energy to boost the heat production of a building is a sustainable way to reduce the environmental impact and cut the costs, which is why the climate panel should be developed further.