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Present an Active Solar Energy System to Supply Heating Demands of the Teaching Staff Dormitory of Islamic Azad University of Ramhormoz

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Abstract : The purpose of this paper is to present an active solar energy system to supply heating demands of the teaching staff dormitory of Islamic Azad University of Ramhormoz. The design takes into account the solar radiations and climate data of Ramhormoz town and is based on the daily warm water consumption for health demands of 450 residents of the dormitory, which is equal to 27000 lit of 50 C° water, and building heating requirements with an area of 3500 m² well-protected by heatproof materials. First, heating demands of the building were calculated, then a hybrid system made up of solar and fossil energies was developed and finally, the design was economically evaluated. Since there is only roof space for using 110 flat solar water heaters, the calculations were made to hybridize solar water heating system with heat pumping system in which solar energy contributes 67% of the heat generated. According to calculations, the Net Present Value “N.P.V.” of revenue stream exceeds “N.P.V.” of cash paid off in this project over three years, which makes economically quite promising. The return of investment and payback period of the project is 4 years. Also, the Internal Rate of Return (IRR) of the project was 25%, which exceeds bank rate of interest in Iran and emphasizes the desirability of the project.

Keywords : solar energy, heat demand, renewable, pollution
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