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PRELIMINARY SIZING AND OPTIMIZATION OF A MICRO SOLAR POWER PLANT BY A PARAMETRIC SENSITIVITY STUDY

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Abstract

This paper presents the pre-sizing of the thermal storage and the solar receiver area of a thermodynamic micro power station. Linking efficiency formulas of the different components, inspired from the literature, leads up to model the whole plant in a single way, and in the same time relevant losses parameters render certain physical realities. The study is developed in two steps: the first one is a pre-sizing of the plant within chosen solar receiving and storage temperature ranges, in order to spot potential optimal sizing, the second step is a parametric sensitivity study of the represented losses factor for a possible optimum temperature levels. The obtained results allows to define technical specifications as a starting point for different industrial and university partners, each working on the design of specific elements.

Key words: off-grid solar energy, optimization, Stirling engine, thermal storage

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