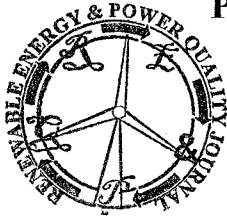


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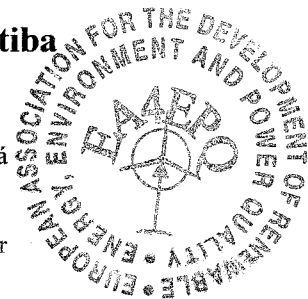
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## Proposal for the use of solar heaters in small residences of Curitiba

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**Summary.** This article seeks to determine a proposal for the use of thermal solar heaters for small residences in Curitiba-PR, Brazil, being considered "small" residences of up to 100 m<sup>2</sup>, what is equal, according to the Institute of Research and Urban Planning of Curitiba (IPPUC), to 26% of the total of all of the residences of the city. For the elaboration of the work, the averages of solar irradiation were considered in the city.

The factor of solar irradiation in this research is of addition importance, because it indicates us which is the participation of the solar energy in the generation of thermal energy through the system of solar heating.

Being known the total thermal energy necessary, energy generated by the system of solar heating and the energy generated by the auxiliary system, it was possible to relate data obtained with the values of the tariffs of electric power of the city, and in this way, it was possible to study the economical viability of the system. In this proposal we verified that the investment return will come in the 5th year of implantation.

### Keywords

Solar energy, solar collector, thermal heating, solar irradiation, renewable energy, environmental effects.

### 1. Introduction

Approximately 6,7 billion existent people in the Earth are responsible so that the world energetic demand presents a scenery of growth dizzy and consequently preoccupying in the extent of shortage of energy. For this reason, the man should look for energy alternatives in the nature, in other words, to develop and to perfect renewable alternative sources of energy to aid in the supply of the world demand.

This article is limited to the study of the technical and economical viability of the use of the thermal solar energy in the residences of the city of Curitiba.

The current patterns of production and consumption of energy are based on the fossil sources, what generates emissions of pollutant, greenhouse effect gases and they put in risk the supply of long period of fossil fuels of the planet. It is necessary to change those patterns stimulating the use of the renewable energies, and, in that

sense, Brazil presents a quite favorable condition in relation to the remaining of the world [1].

The main problem discussed in this article approaches the costs and incentives, especially in the Brazilian context, for productions centered in the reception and transformation of the solar energy, in compatible levels with the common use, in this case, in the heating of water, usual in the Brazilian homes.

This article presents a study where we verified if there is or no, technical and economical viability in the use of systems of solar collectors for heating of water, in residences in the city of Curitiba.

The article also analyzes the environmental degradation resulting from the energy generation originating from the installation of hydroelectric power stations, the main generating source of energy in Brazil, and the investigation need concerning themes as the environmental subject in confrontation with the pollution originating from of activities related with the production of energy and the new globalization context that demands clean energy activities.

With the technological progresses and with the need every time larger of production of energy to accompany those progresses is necessary mainly a larger use of alternatives of renewable energy sources to soften the concentration and dependence of the conventional sources of energy and that philosophy should be present in the daily of the people. Therefore, our proposal also fills out this requirement turning each residence a source producing of energy.

### 2. Energy Potential

The meaning of the word "energy" is linked to the innate potential for execution of any work or action, being used in different contexts.

The humanity, immersed in their crescents scientific, social, technological, economical, and productive needs, depends on energy (in their more varied forms) to stay in constant evolution. It happens, however, that the production of energy, fomented along the great human conquests, little observed on the "atmospheric and