Performances of a 40 kWp grid-connected PV system under tropical climate. A case study : The building of the Regional Council, Saint Denis, Reunion Island.

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Abstract :
This paper presents the performance study of a 40 kWp grid-connected photovoltaic system located in Reunion Island, Indian Ocean. In this island, the energy supply encounters difficulties to face the 7% per year growing energy demand. To solve this problem, the local representatives decided to promote Demand Side Management and the use of Renewable Energy. In 2005, more than 1 MWc grid-connected PV systems have been installed. The knowledge of the performances of these systems under tropical conditions are very poor. The aim of this article is to summarize the first eight months of monitoring of the first monitored system in Reunion Island set-up on the building of the Regional Council. It has 327 m^2 of polycrystalline array and 240 modules of 165Wp each set-up on two locations : On the fourth floor terrace with a 15° tilt angle and an orientation facing north and on the roof terrace of the building with a 0° tilt angle. The performance ratio ranged from 0.59 to 0.79 and the efficiency from 7% to 10%. The mean final yield is 3.2 kWh/kWc.day with a maximum of 4.5 kWh/kWc.day and a minimum of 3 kWh/kWc.day.