

## **Two axis solar tracker based on solar maps, controlled by a low-power microcontroller**

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### **Extended Abstract**

A two axis solar tracking system, according to several studies, increases the energy production of approximately 40%. There are actually several solutions for two axis solar tracking systems using electromechanical devices, in which a controller detects the Sun apparent position, and controls the position of the structure supporting the panels toward the sun by enabling the engines movement. This systems uses sensors to detect the Sun apparent position and the control are based on PLC's. This technology is very precise, however it's quite expensive, which makes the application of solar tracking systems is not very common.

This work studies a solution of two axis solar tracking system based on solar maps, which can predict the exact apparent position of the Sun, by the latitude's location, thereby avoiding the need to use sensors or guidance systems. To accomplish this, it is used a low-power microcontroller, suitably programmed, to control two electric motors to ensure that the panels supporting structure is always oriented towards the sun.

With the developed system the final cost of the solar tracker is significantly reduced compared with current systems used in micro generation installations, and the developed program ensures that the panels are oriented to the Sun every hour, in a 40° North latitude place. Only the limited angles of the structure slightly reduce the production at the beginning and end of the day in the summer months. However, the expected increase of energy production with the developed solar tracker is approximately 40%, which makes it a competitive solution.