

Automatic Sun Tracking Solar Panel

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People are considering to use alternative energy sources due to impending scarcity of nonrenewable resources. From all other resources available, solar energy is the most abundant and it is relatively easy to convert to electric energy. Using solar panels to convert solar energy to electricity is very popular, nevertheless fixed solar panels cannot generate optimum energy due to the east-to-west transition of the sun. To maximize energy, the solar panel must be perpendicular to the sun's rays. If it deviates from this optimum angle, the energy generation efficiency from the panel decreases. The active tracker relies on the detection circuit to detect the light intensity and align the panel as the sun using a motor. This project was designed and implemented for a polar single axis solar panel tracker. It has a fixed vertical axis and an adjustable horizontal motor control axis. The tracker actively tracks the sun and changes its position to maximize energy output. This system solves the problem by arranging solar panels to track the sun. This tracking movement is accomplished by using a servomotor on the solar panel so that the panel always keeps its face perpendicular to the sun to generate maximum energy. This is accomplished by using a programmed Arduino board according to the light sensor (LDR) signal, the servo motor sends a signal to rotate the attached panel as needed. Subsequent, the interface with the sensor, the control of the motor, and the power supply function are performed by the energy generated from the solar panel. This is a far more cost effective solution than purchasing additional solar panels when dealing with large panel arrays. This project develops an automatic tracking system which will keep the solar panels aligned with the sun in order to maximize efficiency, which is capable of enhancing production of power by 20-30%. It has been estimated that the use of a tracking system, over a fixed system, can increase the power by 30-60%.

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