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Global prospects, progress, policies, and environmental impact of solar photovoltaic power generation

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ABSTRACT

Global energy demand and environmental concerns are the driving force for use of alternative, sustainable, and clean energy sources. Solar energy is the inexhaustible and CO₂-emission-free energy source worldwide. The Sun provides 1.4×10^5 TW power as received on the surface of the Earth and about 3.6×10^4 TW of this power is usable. In 2012, world power consumption was 17 TW, which is less than 3.6×10^4 TW. Photovoltaic (PV) cells are the basic element for converting solar energy into electricity. PV cell technologies, energy conversion efficiency, economic analysis, energy policies, environmental impact, various applications, prospects, and progress have been comprehensively reviewed and presented in this paper. This work compiles the latest literature (i.e. journal articles, conference proceedings, and reports, among others) on PV power generation, economic analysis, environmental impact, and policies to increase public awareness. From the review, it was found that PV is an easy way to capture solar energy where PV based power generation has also rapidly increased.

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