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Photovoltaic Solar Energy: From Quartz to Silicon, Cells, Panels and Photovoltaic Systems

The primary energy sources currently used in the world come from fossil fuels (oil, natural gas and coal), in addition to nuclear and hydroelectric energy. All of them pose serious environmental problems, including hydroelectric power, with most natural reserves running out. Several proposals were investigated and adopted on a smaller scale to overcome these problems, with photovoltaic conversion being undoubtedly one of the most prominent in the current scenario. Solar panels require little maintenance, have a useful life of over 25 years, do not generate waste, noise or pollutants that contribute to acid rain and urban pollution. In this lecture, the concepts of photovoltaic solar energy generation will be presented; the silicon purification processes; manufacture of conventional and third generation solar cells; photovoltaic panels; photovoltaic plants and the world panorama of the use of photovoltaic systems.

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