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ENHANCED SPACE BASED SOLAR POWER STATION - USING TOTAL INTERNAL REFLECTION

Abstract

The Sun remains the best unlimited source of energy. Efficiency of the present solar cells is not high enough and therefore better ways of tapping solar energy are required. The concept is to design an outer structure which will enclose the solar cell in such a way that it absorbs all or the maximum amount of light incident on it. The structure will be made of a transparent material and will use the principle of Total Internal Reflection to trap all the light incident in its direction. The cell itself will be modified into a three dimensional design so that there are more surfaces than one to absorb all the light trapped by the outer structure and hence produce and store more energy at a quicker rate. The modified solar cell design helps reducing area and increasing absorption by the whole array. The solar power station could be set up in the LEO or GEO. Since solar cells are very durable and possess long working lives, these stations can be used for about 20 years with no or minimum maintenance. The energy absorbed and stored can be used for many purposes. It can either be transmitted back to Earth using microwaves or it can be stored in reusable 'Energy Cells'. These energy cells can be carried by other crafts for longer missions. The station could also be set up on the Moon which can then act as a spaceport. Since the source of the energy remains unlimited, this kind of a power station is an extremely feasible option. With the growing energy demands such space based power stations could be possible solutions.