A Magnetic Brush that Cleans Solar (PV) Cells from Dust and Sand without the Use of Water

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Solar (PV) cells play a major role in turning our world green. The accumulation of dust and soil on the surface of (PV) cells drops its efficiency up to 85%.All technologies used for cleaning (PV) cells involve the use of water and electricity which is not considered environmentally friendly. Our primary designs were developed using rudimentary tools such as wood, metal rulers etc. Our final mechanical system was developed in order to clean the (PV) cells efficiently without the use of water and using minimal amount of electricity. The (PV) cell is placed on a frame at a tilt angle of 27o. An acrylic axis which is embedded with 3 magnets is hanged above the solar cell(1.0cm).The axis is attached to wheels that moves smoothly through a track which is placed top and bottom sides of the solar cell. This central axis is attached with iron filings acting as a brush (a soft sponge can be attached to the iron filings without glue); it moves side to side continuously removing any dust. This movement is provided by a rotating axis at the left side of the solar cell. The rotating axis which is embedded with 2 magnets creates repulsion forces with the central axis and thus pushing to the opposite side. As the central axis moves, the rotating axis flips sides; it is done by using a small electric motor which uses a minimum amount of power from a power bank. This design was tested on a (PV) cell (15x20 cm) of maximum output energy 73036.8J but when the cell gets dirty after leaving it outside for 8 days, the output energy dropped to 42854.4J.This means that 59% of the expected energy was obtained only. When the solar cell was tested for 8 days and the magnetic system operated for 30 seconds only every day at 12PM, 82% of the maximum expected output energy was obtained.

Awards Won:

Qatar Foundation, Research &amp Development: Award of $1,000