

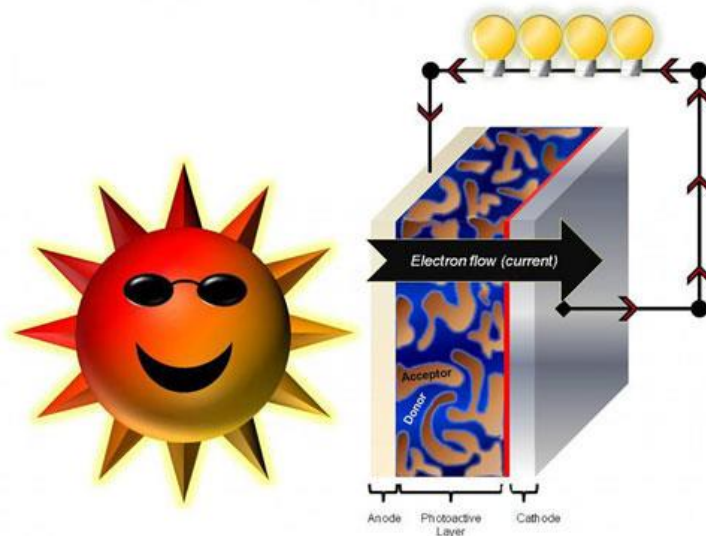
## NANOSCIENCE AND NANOTECHNOLOGY ON ENERGY SOURCES

### NP CELE

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### ABSTRACT

Why is nanoscience relevant in energy? Many effects important for energy happen at the nanoscale. In solar cells, for instance, photons can free electrons from a material, which can then flow as an electric current; the chemical reactions inside a battery or fuel cell release electrons which then move through an external circuit; or the role of catalysts in a plethora of chemical reactions. These are just a few examples where nanoscale engineering can significantly improve the efficiency of the underlying processes.



**Figure 1:** The working principle of a solar cell (Source University of Massachusetts Amherst)

Nanotechnologies are not tied exclusively to renewable energy technologies. While researchers are exploring ways in which nanoscience could help us to develop energy sources, they also develop techniques to access and use fossil fuels much more efficiently. Corrosion resistant nanocoatings, nanostructured catalysts, and nanomembranes have been used in the extraction and processing of fossil fuels and in nuclear power. Nanotechnology applications for energy are extremely varied, reflecting the complexity of the energy sector, with a number

of different markets along its value chain, including energy generation, transformation, distribution, storage, and usage.

Nanotechnology has the potential to have a positive impact on all of these.

**Key Words:** *Nanotechnology, nanocoatings, nanostructured catalysts, nanomembranes, renewable energy technologies.*