

Nanotechnology may be key to solar energy and energy storage

A new study from the IEC (International Electrotechnical Commission) in Switzerland and the Fraunhofer Institute for Systems and Innovation Research ISI in Germany has found that nanotechnology will bring significant benefits to the energy sector, especially to energy storage and solar energy. Improved materials efficiency and reduced manufacturing costs are just two of the real economic benefits that nanotechnology already brings these fields and that's only the beginning. Battery storage capacity could be extended, solar cells could be produced cheaper, and the lifetime of solar cells or batteries for electric cars could be increased, all thanks to continued development of nanotechnology.

The rise of nanomaterials

A key finding of the study is that technologies where "nano" already plays an important role will be of special interest for industry and research.

The following nanomaterial technologies will be of particular importance: "organic and printed electronics", "nano-coatings", "nano-composites", "nano-fluids", "nano-catalysts", "nanocarbons" and "nano-electrodes". These seven technology profiles form the basis for two comprehensive roadmaps in the technical report.

For example, through the use of nanotechnology the light and energy generation of crystalline silicon solar cells or organic solar cells can already be enabled or significantly increased. Their manufacturing also requires less material and is more cost-efficient.

Energy storage capacity will significantly improve with the use of nanomaterials for lithium-ion batteries. This is by far the most important battery technology for energy storage since the early 1990s. It is especially important in view of the constantly increasing demand for electric vehicles, whose success is also directly linked to battery performance and resulting range extension.

Large-scale application in solar power generation and energy storage

Dr. Björn P. Moller, project leader of this study at Fraunhofer ISI is convinced that everything points to its large-scale application in solar power generation and energy storage, unlike many other fields where nanotechnology has been unable to make a break-through.

Moller said, "It can be assumed that in 2035 the share of fossil fuels in global energy production will have decreased to 75%. This implies that renewable energy will need to contribute significantly more to the overall energy generation. It is therefore crucially important that key technologies such as solar cells are further

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developed with the help of nanotechnology and that energy storage is improved.”

“In some areas nanotechnology may even be a key to success. There is great potential for nanotechnology to help to mitigate the intermittency of renewable energy,” Moller said.

Role of nanotechnology in addressing the energy challenge

“Commissioning this study to evaluate the potential of nanotechnologies and the future role of nanomaterials in addressing the energy challenge helps the IEC to understand the kind of work that it needs to undertake to enable the broad roll out of these technologies,” said IEC General Secretary and CEO Frans Vreeswijk.

“Against the backdrop of an anticipated 30% increase of global energy demand by 2035 and the significant expansion of renewable energy coming into the grid, the study has found that nanotechnologies including new nanomaterials, could be a key to successful renewable energy and energy storage integration.”

Study: [Nanotechnology in the sectors of solar energy and energy storage](#) [1]

Source: [International Electrochemical Commission](#) [2]

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