

**Editorial****Aptness of Nanotechnology to Combat Energy Crisis**

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With the demand for energy growing by the day and resources exhausting fast, governments round the world are faced with the challenge of finding solutions to the significant energy demand problem without releasing more carbon dioxide into the atmosphere. Here, nanotechnology may be able to offer some solutions. Nanotechnology is being used to develop cleaner, more economical and more efficient sources of energy. Employing nanotechnology, more efficient batteries and fuel cells are being developed. Fuel cell batteries made up of nanometer components can power automobile and other equipments, such as computers. The development of nanotech to power vehicles and other machines is in part a response to the growing scarcity of fossil fuels. When compared to nano-energy, do not offer energy that is clean, plentiful, or economical. The efficiency of the traditional vehicle fuels, gasoline and diesel, can also be increased through nanotechnology. a catalyst made up of nanoparticles is more effective. Also, nano energy, when it is in the form of enhanced diesel and gasoline fuels, can be produced from previously unusable raw materials and more economically at that.

Ever since their invention in the late 1870s, traditional electric light tubes have used metal filaments to emit light. The metal filament generates a lot of heat, so it is a drain on electricity. While light-emitting diodes (LEDs) are forms of nano energy that are used to make the production of artificial light more energy-efficient. Semi-conducting organic layers, separated by an area roughly equivalent to 100 nanometers, allow for a minimal amount of required energy for giving off light. Researcher Michael Demkowicz at the Massachusetts Institute of Technology (MIT) is developing a nanocomposite that can resist damage from radiation and could be used instead of stainless steel to line a nuclear reactor. The material would extend the life of the reactor and allow it to operate more efficiently because it could burn a higher percentage of nuclear fuel, also resulting in less radioactive waste. Other composites, such as fibreglass and carbon fibre, with nanoengineering, can be made to change shape under certain conditions, producing more efficient turbine blades in wind and tidal generators.

Nano energy also offers alternatives for electrical power generation, especially as far as the heating and air conditioning of homes and other buildings is concerned. The harnessing of unlimited solar energy is the most obvious example. This nano energy source has the advantage of eliminating dangerous emissions like carbon dioxide, which escapes into the atmosphere when traditional heating energies like those created from coal and natural gas are used. The use of solar nano energy is an attempt to cut energy costs, not just in terms of economics, but also in terms of human and animal health problems. Solar cells can be made more efficient than conventional cells by nano-engineering combinations of materials, in which each layer captures energy from a particular colour in the spectrum of sunlight. These multi-junction solar cells already have an efficiency of over 40%, much higher than the 20% conventional panels can produce, but they currently remain too expensive to be competitive.

Nano solar cells embedded in flexible plastics will be able to adjust to the shape and terrain of the rooftops. Thus, it will be possible to produce energy at every rooftop. With nanotechnology, tiny solar cells can also be printed onto flexible, very thin light-retaining materials, bypassing the cost of silicon production. Nano cells made up of materials, several thousand times smaller than hair, will have more light capturing capabilities. Each nano solar cell can be an energy collector and spread with the plastic sheets to cover large surface areas than photovoltaic cells. nanotubes can also help in absorption of solar energy and its conversion to electrical energy due to their structure. By

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integrating applications of nanoscience, “solarfarms” may be created consisting of plastic materials with solar cells that can be rolled across deserts to generate energy.

Nanotechnology also enables production of solar cell glass that will not only generate energy, but also act as windows in future houses and commercial buildings. While it captures solar energy to power the building it also reduces overheating of the house thereby reducing the need for cooling. Cheap nanofabrication will also lead to such things as materials for passive energy management, such as electrochromic or photochromic smart windows; efficient energy conversion devices such as non-thermal illumination sources (e.g. white LEDs); electrosynthesis for fuel manufacture and electricity storage, and better electricity storage devices such as batteries and high performance ultracapacitors.

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