

Role of Nanotechnology in the Energy Industry

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Abstracts

Nanotechnology is the study of manipulating matter on an atomic and molecular scale.

Nanotechnology is very diverse, ranging from extensions of conventional device physics to completely new approaches based upon molecular self-assembly, from developing new materials with dimensions on the nanoscale to investigating whether we can directly control matter on the atomic scale.

Nano-engineered materials offer extraordinary new capabilities for the improvement of energy generation and efficiency. The use of high surface-to-area ratio carbon nanotubes in battery electrodes generates an increase in electricity output over traditional electrodes.

Some of the segments of the energy industry where nanotech is being used to include:

Oil and gas extraction

Solar power

Fuel cells

Wind power

Thermoelectricity

Nanobatteries

Nanosupercapacitors

Hydrogen economy

Heat insulation and conductance

Energy security

Renewable energy

Nanocatalysts

Lower energy consumption

Lighting

Transportation

Aruvian's R'search presents a complete analysis of the role nanotechnology plays in the energy industry in its research report *Role of Nanotechnology in the Energy Industry*.

With the global constraints increasing on energy sources, nanotech comes at a time when various segments such as oil and gas extraction could benefit highly from the addition of nanotechnology. In fact, carbon nanotubes are being touted as one of the most 'promising' nanomaterials for energy savings applications.

Consider this: earlier in 2010 itself, the UK Industry Taskforce on Peak Oil and Energy Security issued a warning that the UK may soon be facing oil shortages, supply and price volatility – all of this can become a reality as early as 2015.

Some of the key take aways that this research report offers include:

How nanotechnology is actually benefitting the various segments of the energy industry.

How nanotechnology is being used to make processes faster and more efficient.

What research companies are doing to utilize nanotechnology to derive benefits

from already established processes?

Challenges facing the development of nanotech in the fields of wind power, oil & gas extraction, solar power, and nanobatteries & nanosupercapacitors.

How nanotechnology is being commercialized to make the technology more 'sellable'.

Examples of some of the milestones achieved in this industry and discussed in this research report include:

CSIRO, in conjunction with two Australian universities, is developing nano chemical sensors to enhance discovery rates of untapped oil or gas deposits beneath the seabed.

The UK Engineering and Physical Sciences Research Council is funding research by BP and the University of Surrey to develop 'smart injectable nanoparticles' that can be administered to reservoirs.

The Stanford PULSE Institute for Ultrafast Energy Science has researched the potential of quantum dots to improve solar cell efficiency, demonstrating that in laboratory conditions one photon of light can generate multiple electrons.

Nanosys, Inc. is in a collaborative agreement with Sharp Corporation of Osaka, Japan to develop nanotechnology enabled fuel cells.

Eagle Windpower Oy has used carbon nanotubes bound with epoxy in its small windmill blades.

While, the manufacture of nanomaterials is extremely energy intensive and has a high ecological footprint, it is predicted that in the next 10 years, there will be \$1 trillion worth of new products that use nanotechnology.

Companies analyzed in this report are:

NanoComposites, Inc.

Elemental Analysis, Inc.

Advanced Battery Technologies, Inc.

Cnano Technology Limited

ULVAC Technologies, Inc.

The relatively recent shift towards using nanotechnology will continue to have many positive economic impacts on society.

Aruvians Rsearch's report *Role of Nanotechnology in the Energy Industry* analyzes all the segments in which nanotechnology is being used in the energy industry today and what the future scenario of the industry is expected to look like with nanotech driving growth.

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