

New Science Technology with Many Engineering Applications - Nanotechnology

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ABSTRACT: After scientific research it was found that renewable energy is the option of a clean energy source for providing electricity, without harming the environment. Nevertheless, the alternatives of energy sources are still very limited because of their manufacturing cost. Thus, a new science technology with many engineering applications come into play known as Nanotechnology which helped new industries to develop with cost effectiveness and sustainable growth. Nanotechnology is an interface technology that encompasses many different areas of science and applications. Nanotechnology has become an all-encompassing concept, meaning different things to various individuals. Nanotechnology falls into this category and provides radically new abilities to architect a board collection on a molecular scale with novel materials, composites and structure. Some of the uses for nanotechnology are discussed here and a few instances are seen. That is believed to have the highest likelihood of success in competitive industry. The economically promising nanotechnologies for the future include those with IT applications, electronics, building materials, household appliances, textiles, cosmetics, food, climate, etc.

KEYWORDS: Cost effective, Economically, Energy consumption, Energy source, Engineering applications, Nanotechnology,

INTRODUCTION

These days our main source of energy for human resources are fossil fuels, nuclear energy etc. These resources are injurious to the environment as they cause depletion of ozone layer, increase in global warming because there are a lot of climatic changes and increase in deadly diseases. However, the real problem of polluting the environment are these energy sources since the 18th century, the time of the industrial revolution came and became majorly responsible for emission of CO₂ in the atmosphere [1]. After scientific research it was found that renewable energy is the option of a clean energy source for providing electricity, heat and light without harming the environment. The main advantage of using renewable energy is that no fuel is needed to generate power. According to reports the consumption of fossil fuels like petroleum is higher than the actual creation of nature [2]. Nevertheless, the alternatives of energy sources are still very limited because of their manufacturing cost. Thus, a new science technology with many engineering applications come into play known as Nanotechnology which helped new industries to develop with cost effectiveness and sustainable growth.

Nanotechnology broadly used to define various materials at nanoscale i.e. 1–100nm. However, these properties of atoms and molecules are completely dissimilar. Researchers are going through material properties at the scale of nanometer to find, do they have ability to increase its productivity of currently used energy sources [3]. Nevertheless, nanotechnology is not only the process of miniaturize different atoms and molecules using modern technique but also to design and regulate the change in the composition of atoms & molecules [4]. Nanotechnology has become one of the major parts of research in today's time i.e. 21st century. However, nanotechnology doesn't mean not only miniaturization, but also accurate manipulation of atoms and molecules in order to design the properties of the nonmaterial and control them.

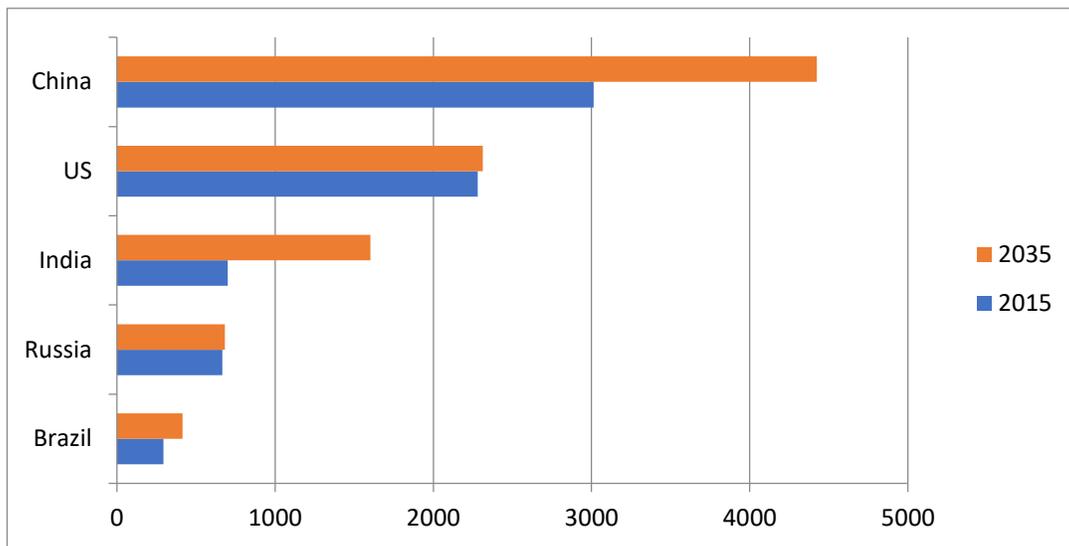


Figure 1: Total primary energy consumption

According to BP Energy Outlook, India's energy consumption is expected to rise by 4.2 percent a year by 2035, faster than that of all the world's major economies (figure 1). India, the second largest energy user in Asia since 2008, overtook Japan as the third largest oil consuming nation in the world in 2015 [5].

LITERATURE REVIEW

Y.Kumarasamy et al in their case study on the topic “Nanotechnology in Mechanical Engineering – Case study” studied uses of nanotechnology in mechanical engineering and manufacturing industry. In order to extend the longevity of components and vehicle parts, nanotechnology can be used. The use of nanotechnology will boost a large range of materials. Uniquely demonstrated nanomaterial with better magnetic characteristics enhanced mechanical operation and increased optical properties are included. Developments are being made to enhance the materials properties and to find alternative precursors that can give the materials desirable properties [3].

The authors in their web article titled “Micro and Nanotechnology” talks about the latest frontier innovation , nanotechnology, as a imagining new prospects in processing, fluid dynamics, robotics, combustion, biomedicine, calculation, heat transfer, and more [6]. The authors of their published book titled “Application of Nanotechnology in the energy sector ” mentions that, Nanotechnology provides critical enhancements potentials for the development of both traditional sources of energy (fossil and nuclear) and alternative sources of energy, such as geothermal, solar, wind, water, tides or biomass [7] .

DISCUSSION

The major energy consuming industries that are mechanical engineering and manufacturing, nanotechnology is extremely useful for the industry. For extending the longevity of components and vehicle parts, nanotechnology can be used with better magnetic characteristics enhanced mechanical operation and increased optical properties. Small things have a big future. The latest frontier in innovation is nanotechnology, imagining new prospects in processing, fluid dynamics, robotics, combustion, biomedicine, calculation, heat transfer, and more. Purdue hosts the Birck Nanotechnology Hub, the largest academic clean room in the world, where interdisciplinary teams have access to the absolute cutting-edge of nano-scale technology such as: Nanoscale manufacturing, Micro- and nano-fluidics, Biomolecular detection, Computational modeling, Nanoscale thermal transport, Nanomechanical materials etc.

CONCLUSION

One of the most significant studies in the 21st century is nanoscience and nanotechnology. The field of materials is being revolutionized by nanotechnology. The development of a new generation of composites with improved flexibility and a wide variety of applications has a very high impact. Future trends include the application of this nanotechnology to additional polymer system forms, which are likely to be a requirement for the production of new compatibility strategies. Due to the small size of nanomaterials, it is possible to modify their physical and chemical properties to enhance the overall properties of the convection material. The use of nanotechnology has also helped to produce materials that are more effective and sustainable. The use of steel, glass, and nanotechnology coatings helps to protect the layers from corrosion. The economically promising nanotechnologies for the future also include those with IT applications, electronics, building materials, household appliances, textiles, cosmetics, food, climate etc.

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