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TITLE: Energy supply, its demand and security issues for developed and emerging economies

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ABSTRACT:

Energy is inevitable for human life and a secure and accessible supply of energy is crucial for the sustainability of modern societies. Continuation of the use of fossil fuels is set to face multiple challenges: depletion of fossil fuel reserves, global warming and other environmental concerns, geopolitical and military conflicts and of late, continued and significant fuel price rise. These problems indicate an unsustainable situation. Renewable energy is the solution to the growing energy challenges. Renewable energy resources such as solar, wind, biomass, and wave and tidal energy, are abundant, inexhaustible and environmentally friendly. This article provides an overview of the current and projected energy scene. Five countries, that presently have a significant impact on global energy situation, have been studied in this work. These include China, India, Russia, UK and USA. Together the present energy budget of these countries is roughly half that of the globe. Four of the above five countries that are discussed in this work?China, India, UK and USA are all net importers of energy and are heavily dependent on imports of fuel to sustain their energy demands. Their respective local oil reserves will only last 9, 6, 7 and 4 years, respectively. China, the emerging economy in the world, is however making exemplary development in renewable energy?in 2004 renewable energy in China grew by 25% against 7?9% growth in electricity demand. While in the same year, wind energy in China saw a growth of 35%. China is also leading the global solar thermal market as it has already installed solar collectors over 65 million square meters, accounting for more than 40% of the world's total collector area. This article quantifies the period of exhaustion of the current major energy sources, i.e. coal, oil, gas and nuclear fissile material. Projected demand for energy is also presented and a feasibility of switch over to renewable energy is discussed. The article also presents the size of respective wind- and solar farms that would be required for each of the five countries under discussion to meet their year 2020 energy demands. It has been found that to meet 50% of the total energy demands the proposed area for collection of solar and wind energy by means of ultra-large scale farms in fact will occupy a mere fraction of the available land and near-offshore area for the respective countries, e.g. a solar PV electricity farm of 61 km² for China represents 0.005% of the Gobi desert. Likewise, the 26 and 36 km² PV farm area, respectively, required for India and the US represents 0.01% and 0.014% land area of Rajasthan and Baja deserts. The above areas required for the farms may be further split to form a cluster of smaller energy farms.

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