**Clean Energy for a Growing and Prospering World**

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**Abstract:**

Over the last 10,000 years, the human population has increased from 4 million people to currently 7.7 billion. This 2000-fold increase in the population coupled with a 30-fold increase in the per capita energy consumption has put a significant pressure on the energy use, mostly for moving, heating, lighting, cooling and information processing. In the meantime, due to research and innovation, the efficiencies of energy convertors have significantly improved, and the world has moved from using wood to more-energy dense fossil fuels. Unfortunately, the fossil gas and oil resources are depleting at an alarmingly fast rate which can cause a major disruption in the world economy. A sustainable source of energy is the one that can satisfy our present need without jeopardizing the future supply. Biomass, solar photovoltaic, solar thermal, wind, and hydrokinetic energies are being development to address and shortfall as well to provide a less polluting energy. Significant recent innovations have been made in these technologies, which will be discussed. However, some key challenges remain for technologies to become economically competitive.

**Biography:**

Dr. Ram B. Gupta is a Professor and the Associate Dean for Faculty Research Development in the College of Engineering at the Virginia Commonwealth University, Richmond, VA. Prior to joining VCU, during 2011-2014, he was the Director of the Energy for Sustainability Program at the U.S. National Science Foundation. This program supported fundamental research and education to enable innovative processes for the sustainable production of electricity and transportation fuels. Projects included those related to biofuels, photovoltaic solar energy, wind energy, and advanced batteries for transportation. During 1995-2011, he was a professor of chemical engineering at Auburn University. He has published numerous research papers and patents on pharmaceuticals and fuels, and is the recipient of Wright A. Gardner Award (2013) from the Alabama Academy of Science, Distinguished Graduate Faculty Lectureship award (2007) from Auburn University, Science and Engineering Award (2002-2004) from DuPont, Junior and Senior Research awards (1998, 2002, 2009) from Auburn Alumni Engineering Council, the James A. Shannon Director’s Award (1998) from the National Institutes of Health, and Young Faculty Career Enhancement Award (1997) from Alabama NSF-EPSCoR. His recent books include *Nanoparticle Technology for Drug Delivery* (2006, Taylor & Francis), *Solubility in Supercritical Carbon Dioxide* (2007, CRC Press), *Hydrogen Fuel: Production, Transport, and Storage* (2008, CRC Press), *Gasoline, Diesel and Ethanol Biofuels from Grasses and Plants* (Cambridge University Press, 2010), and *Compendium of Hydrogen Energy* (Elsevier, 2015).

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