Global Warming
- How Power Electronics Can Help In Solving The Problem?

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ABSTRACT
Energy has been the life-blood for continuing progress of human civilization. Since the beginning of industrial revolution around two hundred years ago, the global energy consumption has increased dramatically to accelerate our living standard, particularly in the industrialized nations of the world. Par-capita energy consumption, particularly in electrical form, has been a barometer of a nation's economic prosperity. Today, the major portion of world's electrical energy is generated by fossil fuel and nuclear power plants. Fossil fuels have limited resources. Besides, burning of fossil fuels creates environmental pollution problem that causes global warming. Global warming causes sea level rise due to melting of glaciers and polar ice caps that inundates low-lying areas of the world. Besides, it creates adverse effect on world climate that mostly affects the poor tropical nations near the equator. Solving global warming problem is now a serious challenge before us because of its disastrous consequences that will cause serious unrest in the world. The nuclear energy is free from environmental pollution, but it has safety and serious waste disposal problems. The challenge before us: How can we continuously improve our living standard, but at the same time, maintain cleaner and safer environment? Increasing emphasis on renewable energy sources, to some extent, will solve the above problems. However, conservation of energy with more efficient use of electricity is the definite way to mitigate the environmental problems. Power electronics is now destined to play a key role in the global energy conservation scenario in addition to its traditional role in industrial automation and efficient energy systems.

The presentation will start with broad introduction of global energy generation and consumption scenarios, depletion of fuel resources, and environmental pollution problems by fossil fuels. There will be particular emphasis on global warming problem – its causes and possible mitigation effects. The carbon (CO_2) emission curves of USA and other dominant countries in the world at present and future will be analysed. The Kyoto Protocol and carbon emission trading will be discussed. Solving or mitigation of global warming problems will be discussed. The important role of power electronics in energy conservation will emphasized. The role of power electronics in wind energy, photovoltaics, fuel cell systems and electric/hybrid vehicles will be discussed. A number of example applications of power electronics in energy saving will be discussed.

Biography

Dr. Bose has held the Condra Chair of Excellence (Endowed Chair) in Power Electronics at the University of Tennessee, Knoxville, since 1987, where he was responsible for teaching and the research program in power electronics and motor drives. Concurrently, he was the Distinguished Scientist (1989-2000) and the Chief Scientist (1987-1989) of EPRI-Power Electronics Applications Center, Knoxville, TN. Prior to this, he was a Research Engineer in the General Electric Corporate Research and Development Center (now GE Global Research Center), Schenectady, NY, for 11 years (1976-1987), an Associate Professor of Electrical Engineering, Rensselaer Polytechnic Institute, Troy, NY for five years (1971-1976), and a faculty member at Bengal Engineering and Science University (BESU) for 11 years (1960-1971). He is specialized in power electronics and motor drives area, and has given extensive contributions in power converters, PWM techniques, electric/hybrid vehicle drives, microprocessor/DSP control, simulation, renewable energy systems, and application of artificial intelligence techniques (expert system, fuzzy logic and neural network) in power electronic systems. He has been power electronics consultant in a large number of industries. Dr. Bose has authored more than 200 papers and holds 21 U.S. patents. He has authored/edited seven books in power electronics: *Power Electronics and Motor Drives – Advances and Trends* (Elsevier/Academic Press, 2006), *Modern Power Electronics and AC Drives* (Prentice-Hall, 2001), *Power Electronics and AC Drives* (Prentice-Hall, 1986), *Power Electronics and Variable Frequency Drives* (Wiley/IEEE Press, 1997), *Modern Power Electronics* (IEEE Press, 1992), *Microcomputer Control of Power Electronics and Drives* (IEEE Press, 1987), and *Adjustable Speed AC Drive Systems* (IEEE Press, 1981). He has given invited seminars, tutorials and keynote addresses extensively throughout the world, particularly in IEEE sponsored programs and conferences. “Bimal Bose Award in Power Electronics” has been established by IETE, India to recognize outstanding contribution in the field.

Dr. Bose has served the IEEE in various capacities, including Chairman of the IEEE Industrial Electronics Society (IES) Power Electronics Council, Associate Editor of the IEEE Transactions on Industrial Electronics, IEEE IECON Power Electronics Chairman, Chairman of the IEEE Industry Applications Society (IAS) Industrial Power Converter Committee, IAS Member of the Neural Network Council, Vice-Chair of the IEEE Medals Council, Vice-Chair of the IAS Distinguished Lecture Program, Member of IEEE-USA Energy Policy Committee, Member of the IEEE Fellow Committee, Member of IEEE Lamme Medal Committee, Member of the Editorial Board of the Proceedings of the IEEE, and Member of IEEE Spectrum Advisory Board. He was the Guest Editor of the Proceedings of the IEEE (Special Issue of Power Electronics and Motion Control, August 1994), and Special Section Editor of IEEE Transactions of Industrial Electronics (Neural Network Applications in Power Electronics and Motor Drives, February 2006). Dr. Bose has B.E. degree in 1956, M.S. degree in 1960 and Ph.D. degree in 1966.

Dr. Bose is a nine-time winner of professional Awards of which seven are IEEE Awards.

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