

# ENERGY, GLOBAL WARMING AND ROLE OF POWER ELECTRONICS\*

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## Abstract

Energy is the life-blood for continuing progress of human civilization. Since the beginning of industrial revolution more than two hundred years ago, the global energy consumption has increased dramatically to cater the need of growing population and to accelerate our living standard. Per-capita energy consumption of a nation has been a barometer of its prosperity. Today, the major portion of world's energy is generated from fossil fuel and nuclear power plants. Fossil fuel resources are limited. Besides, burning of fossil fuels causes environmental pollution problems, particularly the global warming or climate change. Global warming causes sea level rise due to melting glaciers and polar ice caps that causes inundation of low-lying areas of earth displacing millions of people. In addition, it causes adverse effects on world climate, such as droughts, hurricanes, floods, spread of diseases and extinction of some animal species, besides affecting the marine life by ocean water acidification. Solving global warming problems without affecting the quality of our life is a serious problem in our society. Note that nuclear energy does not cause environmental pollution like fossil fuels, but has safety and radioactive waste disposal problems. For these reasons, the world is now increasingly emphasizing safe and environmentally clean renewable energy sources, such as wind, solar, wave, tidal and geothermal. Some of these resources are cheap and abundant in nature. Electric and hybrid vehicles, instead of traditional ICE vehicles, that use clean energy sources also provide solution. Widespread conservation of energy with energy-efficient applications is a definite way to mitigate our environmental problems. The application of power electronics is extremely important in renewable energy systems, electric/hybrid vehicles and improving energy efficiency.

The presentation will start with a review of evolution of industrial civilization and increasing demand of energy due to rising world population and the quest for betterment of our living standard. The global energy generation scenarios, depletion of fossil fuel resources and environmental pollution problems by fossil fuels will be discussed. There will be emphasis on generation of green house gases (GHG) by burning fossil fuels and their effects on global warming problems. Some example scenarios as predicted by United Nations will be discussed. Then, solving the global warming problems will be discussed. The presentation will particularly emphasize the role of power electronics by energy saving, renewable energy systems and electric/hybrid vehicles.

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\*The seminar will be given in Nikola Tesla Symposium on December 17, 2013 to be held in Zagreb, Croatia on the occasion of 70<sup>th</sup> death anniversary of Tesla. We remember Tesla on this day and pay our deep homage to him since his contributions revolutionized the world of electricity and helped us to live in a better world.