Expansion of Sustainable Humanosphere with Space Environment Use

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In 2007, the IPCC (Intergovernmental Panel on Climate Change) Fourth Assessment Report summarized there is no doubt that human activities have caused the global warming. They estimate surface air warming in the 21st century as follows ; 1) Best estimate for a 'low scenario' is 1.8 ^{o}C with a likely range of 1.1 to 2.9 ^{o}C, 2) Best estimate for a 'high scenario' is 4.0 ^{o}C with a likely range of 2.4 to 6.4 ^{o}C, 3) A temperature rise of about 0.2 ^{o}C per decade is projected for the next two decades for all scenarios. They conclude that we have to reduce the all long-lived greenhouse gases in half.

However, human being can not help expanding their activities to live. Based on the ethical doctrine that human nature is fundamentally evil, we have to not only maintain sustainable humanosphere but also to expand the sustainable humanosphere. The humanosphere corresponds to the planet Earth and space where human activities take place.The Stern Review on the Economics of Climate Change is a report released on October, 2006 by economist Nicholas Stern for the British government, which discusses the effect of climate change and global warming on the world economy. Its main conclusions are that one percent of global gross domestic product (GDP) per annum is required to be invested in order to avoid the worst effects of climate change, and that failure to do so could risk global GDP being up to twenty percent lower than it otherwise might be. Stern's report suggests that climate change threatens to be the greatest and widest-ranging market failure ever seen, and it provides prescriptions including environmental taxes to minimize the economic and social disruptions.

As the Stern Review, including on two contradicted requirements of expanding human activities and sustainable Earth, we can evade from the miserable future predicted in the IPCC Fourth Assessment Report. On contrary, we have to start counter plans against the global warming immediately before natural resources runs out. We propose a Space Solar Power Station/Satellite (SPS) for expansion of the sustainable humanosphere. To use space environment is to survive on Earth for human being.

The SPS is one of most important system which is important and significant for humanosphere in future. The SPS is a gigantic solar power station orbiting in the Geostationary Earth Orbit (GEO), in which generated electric power is transmitted to ground via microwave (microwave power transmission, MPT). The SPS system has advantage in producing electricity with much higher efficiency compared with a photovoltaic system on the ground because there will be no effect from night and rain when the SPS will be placed in GEO and there is no atmospheric absorption of the microwave. The SPS will be required for higher efficient and lighter weight solar cells, technologies of higher voltage power distribution in space plasmas, higher efficient and higher accurate huge phased array for the MPT, and economical rockets.

Thomas Robert Malthus predicted that human population would be suppressed in near future in his book of 'An essay on the principle of population as it affects the future improvement of society' in the end of 18th century, however, his prediction did not prove right because food production in a unit area was increased extremely. In 20^{th} century, Roman Club calculated the limit of growth because of limitation of Earth size. So in 21^{st} century, we have to expand the humanosphere to use space environment.