

The Future Unlimited Green Energy Source, **Space Based Solar Power System**

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ABSTRACT

Future prosperity of human society is completely depending on the stable and continuous supply of necessary energy. Currently, we are mainly dependent on coal, oil and nuclear power for the primary and final energy consumption. More than 80% of world energy consumption comes from the fossil fuel like coal, oil and gas even though the world leading nations are putting the strong efforts on the dissemination of the new and renewable energies to reduce the green house effects. But these energy sources will be scarce in near future.

For example, one of most important main energy source, the oil will be out of reservoir in 100 years or so. And the coal and the uranium are also not unlimited in quantity and not free from the serious environmental issues. These mean that the sustainable supply of major energy source to replace the current major sources must be found for the future human generation. From these circumstances, we need to identify the reliable and unlimited new energy sources. But the renewable energy sources like wind, biomass, hydro, ocean wave, tidal, geothermal are somehow not stable, not reliable and not abundant enough to be candidates of the next main energy sources. These may be OK for the supplementary energy sources but too weak for the main energy solution as the uninterrupted base-load power supply. In other words, in 50 years or so, we have to develop a new reliable energy supply system to be existed as the modern human society which is sustained by the yearly consumption of about 14 G toe (Tonne of Oil Equivalent) energy currently.

The only remaining solution for the next energy source would be the solar energy. There are two ways of utilization of solar energy, the terrestrial and the

space based. But, the terrestrial solar power generation methods, either solar heat or solar cell, are not able to provide the 24 hour uninterrupted supply of electric power as the current main power sources furnish since it would not be able to generate the electricity during the cloudy days and the nights.

Therefore, the one and only solution for the next generation energy source will be the Space Based Solar Power (SBSP) by the Solar Power Satellite (SPS). The SPS in the geosynchronous earth orbit will be able to beam down the energy by microwave transmission during 24 hours per day without interruption. There may be 1-2 hour of eclipse time twice a year during equinoxes but the neighboring SPSs could take care of the interruption.

But, the most serious obstacle for SPS system would be the launch cost. The current rocket launch cost should be, at least, reduced to the price less than one tenth of the current cost to have economically feasible SPS system. It is well known that the SpaceX of USA is trying to match this target and is lowering the launch price a bit but it is far from enough. But, when we start developing the SBSP system, the enormous amount of launch demand for SPS system would lower the price dramatically through the mass-production of the rocket engines.

In this talk, the SBSP system will be elaborated and the feasibility of SBSP technologies will be discussed after the current status and future perspective of world energy supply is visited. And, the economic competitiveness of SBSP system as the future base-load energy source to realize the energy utopia in future will also be mentioned.