

SPACE SOLAR POWER FOR EARTH

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Abstract

Text

It is very unlikely that society will accept a declining living standard or a degrading global environment caused by the continued reliance on the global use of fossil fuels. Potential fuel shortages, and increasingly adverse effects on the ecology are primarily caused by:

- The unsustainable near-tripling of the global population in the 20th century,
- Continuing increases in per capita fuel consumption to meet demands to achieve improving living standards. These insistent demands are resulting in internationally documented adverse effects on the global ecology,
- The predictable escalating shortages of known oil and gas reserves by the middle of this century at the current consumption rates,
- The uncertainties and costs associated with tapping new fuel sources, e.g., cathrates containing methane, at deep-ocean depths.

There is a growing global consensus that it is imperative to develop all feasible systems for solar energy conversion into useful forms for use on Earth. The question is no longer whether humanity can use the Sun's energy but how best to convert this energy effectively. This can be accomplished on Earth and in space to ensure that the aspirations of all people for a better life can be met without endangering the quality of life on Earth, in this century and in the more distant future.

In 1968, I proposed the concept of a Solar Power Satellite (SPS) designed to convert solar energy in space to microwaves and beaming them to an antenna on Earth where they can be safely and very efficiently converted directly to electricity. This energy supply system is currently being investigated in China, Europe, India, Japan, Russia, and the USA. NASA, with support of Congress, is continuing to advance the development of Solar Space Power (SSP).

SSP in orbit or on the Moon could also provide the energy to change the trajectory of near-Earth objects (asteroids and comets) to prevent their catastrophic impacts with Earth should this be indicated.

Twenty-five years ago, Gerard K. O'Neill, in his pioneering concept of "Human Colonies in Space," recognized that material and energy resources of space will be essential to improving the human condition on Earth, and to build colonies in space.

I firmly believe that ongoing significant international efforts over the next decades will result in demonstrating the feasibility of SSP to fulfill Dr. O'Neill's anticipation.

The benefits of SSP can be achieved because it could meet the following criteria:

- Consistent with economic, ecological and societal criteria,
- Actionable internationally by industry and government decision-makers,
- A global energy option available to meet the needs of all people on Earth for as long as the Sun shines.

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