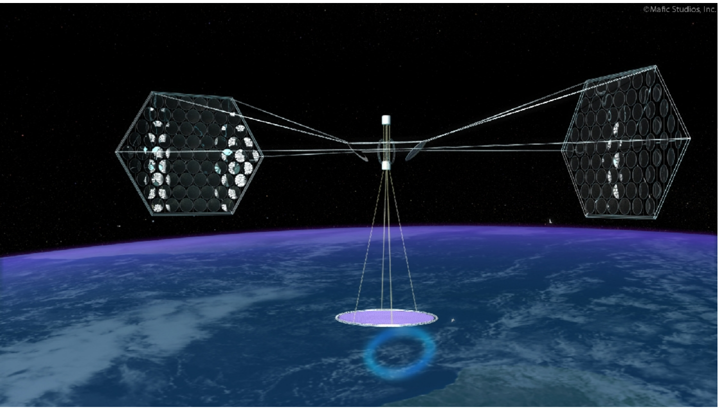
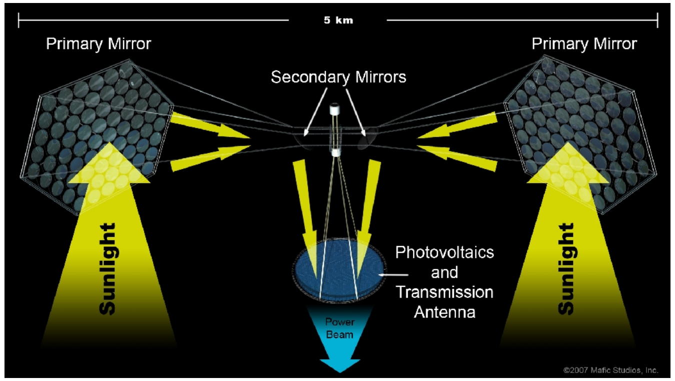


BACKGROUND

Advanced societies worldwide have evolved economies that are heavily dependent on low cost energy. Our present level of technology mostly utilizes energy derived from hydrocarbon resources (oil, natural gas, and coal deposits) created by natural processes that occurred over eons of time and we are consuming those resources at a rate millions of times faster than they are being replaced. As more of the world makes the transition to an advanced energy-dependent economy, the demand for energy will inevitably increase and it is obvious that we will eventually exhaust these resources. In addition, production of energy from these resources (mostly by combustion) releases vast amounts of pollutants into the atmosphere with results that are not fully understood. This leads to the possibility of global warming with catastrophic effects on our environment. Finally, the United States (and most of the other technologically advanced countries) consume more energy than they are able to produce from their own hydrocarbon resources and must import hydrocarbons from areas of the world that are politically unstable.

This places the advanced economies in a vulnerable position where our economies and lifestyles depend on circumstances beyond our control and cause our motives to be suspect in much of the world.

All of the above circumstances make it increasing imperative that we develop alternate ways of meeting our energy needs using renewable non-polluting sources. Many methods are under investigation including Earth-based solar, wind, hydroelectric, wave motion, ethanol, methanol from waste recycling, geothermal and fusion power, but each of these has significant limitations and/or problems. A method that has been studied since the 1960's is harvesting energy from sunlight in geostationary orbit and transmission of that energy by microwave beaming to receiving stations on the Earth's surface. A major study of this concept was conducted by the Department of Energy, NASA, Boeing, Rockwell International and others in the 1977 - 1981 time frame. An executive summary of this work is available on the National Space Society website at:



www.nss.org/ssp/doe/findings
[6.8MB PDF file]

and a detailed description of the proposed Reference System is available at:

www.nss.org/ssp/doe/reference
[13 MB PDF file]

This study proposed a 20 year research and development phase followed by a 30 year deployment phase in which two satellites and ground receiving stations were built per year, each generating 5 gigawatts of electrical power. At completion this would create a total of 60 satellites generating a total of 300 gigawatts of electrical power. (Roughly the equivalent of 170 conventional coal-fired power plants.) The expected cost of electrical power from this system was about 5 cents per kilowatt-hour. (A competitive rate in today's market.) Had this work proceeded as the study proposed, we would now be 8 years into the deployment phase and generating the electrical power equivalent of about 45 coal-fired power plants.

Additional references on this study and other information on solar power beaming may be accessed at:

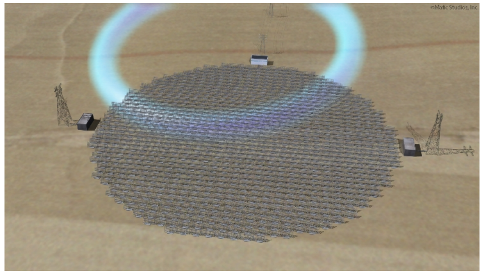
www.nss.org/ssp/doe

The overall conclusions of these early studies were that the concept is technically feasible but there remain significant questions of environmental impact and worker safety, and the economics were not very favorable under the circumstances existing at that time.

Other studies include work by William C. Brown at Raytheon in 1987 on an improved rectenna design available online at:

www.nss.org/ssp/rectenna
[6.5 MB PDF file]

As a result of the ongoing concerns over security of our energy supply, the National Security Space Office (NSSO) launched a new effort in 2007 to revisit the concept of spaced-based solar power (SBSP). A summary and links to relevant documents may be found at:



www.nss.org/ssp/nsso

Space solar power is potentially an enormous business. Current world electrical consumption represents a value at the consumer level of nearly a trillion dollars per year; clearly even if only a small fraction of this market can be tapped by space solar power systems, the amount of revenue that could be produced is staggering.

Space solar power can be developed in a way so as to make it synergistic with ground-based solar power. The terrestrial solar power market will ramp-up the solar array production to the levels required for space solar power anyway; therefore it is possible to build solar power satellites that can take advantage of the ground solar power capacity that will be installed and operational long before the first satellite power station can turn on.

From the point of view of a utility customer, a rectenna to receive space-solar power looks just like a ground solar array-- both of them take energy beamed from outer space (in the form of light for solar power, in the form of microwaves for the space solar power) and turn it into DC electricity. The space solar receivers are set up in the same place as the ground solar arrays. Space solar power becomes a drop-in replacement for an existing product, with the added advantage that it works at night.

Space Based Solar Power