

IAF SPACE POWER SYMPOSIUM (C3)
Solar Power Satellite (1)

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TO STUDY THE PROSPECTS OF LAUNCHING SEVERAL SOLAR POWER SATELLITE FOR
POWER GENERATION IN SPACE

Abstract

Science community is continuously depleting all the resources Earth has to offer, to meet our ever-increasing energy demands. But what happens when we run out of all these resources? How do we meet the impending energy demands on Earth going further? Depleting non-renewable resources has forced the world to shift to clean energy sources. The energy sector remains the most significant contributor to carbonization. Renewable energy sources, though a promising alternative to conventional energy sources, have not yet reached the point of being a one stop solution owing to their various challenges. In this paper we will talk about building solar power satellites that would orbit the Earth. Solar power as we know provides us with more predictable power outcomes, solar farms can generate energy on a massive scale and the solar panels require less maintenance. The next question would be why in space? The reason being the Earth's atmosphere absorbs and reflects sunlight, if the solar cells are above the atmosphere, they would receive more sunlight and will produce more energy. Also, the space based solar power station would orbit Earth 24 hours and provide energy throughout the day in space where the sun is always at noon. The power station would be in the Earth's shadow for a maximum of 72 mins per night at the spring and fall equinoxes at local midnight. Power can be redirected quickly to areas in need. The key challenges to overcome are the design, launch and deployment of such a large structure. Another challenge is to convert the generated electricity into energy waves and then use an electromagnetic field to transfer them to antennas on Earth which would further convert those energy waves back to electricity. We explore these possibilities and opportunities in the present technological context.