

IAF SPACE POWER SYMPOSIUM (C3)
Space Power System for Ambitious Missions (4)Author: Mr. pranav jha
India, pranavjha.et21@rvce.edu.inCOST EFFECTIVE FOLDABLE ORIGAMI STYLE SOLAR PANELS FOR SPACE BASED SOLAR
POWER SYSTEMS.**Abstract**

Space power plants, also known as space-based solar power (SBSP) systems, are a type of renewable energy technology that aims to capture solar energy in space and transmit it wirelessly to Earth.

These power plants would be positioned in geostationary orbit, approximately 36,000 kilometers above the Earth's surface, where they could receive continuous sunlight without being blocked by the Earth's atmosphere or weather conditions. The intensity of sunlight in orbit is approximately 144

intensity on the Earth's surface.

A solar panel placed in space is exposed to sunlight 99

while the same solar panel when placed on Earth shall be exposed to highly diffused sunlight for an average of 29

Foldable origami style solar panels, are favourable for the job as they have low mass to surface area ratio.

Thus, increasing cost efficiency by decreasing payload weight and increasing area for sunlight to fall on.

Transmission of power to Earth can be done via laser or microwave. Laser-based power beaming to Earth could also have various Extraterrestrial applications such as power bases or vehicles on the surface of a moon or a planet.

Microwave based power transmission could be 85

costlier. A rectenna made of dipoles would

act as an Earth-based receiver.

Considering a solar panel mass of 20 kg per kilowatt, a 4GW power station will weigh approximately 80 kilotonnes

With tremendously quick speed

In which progress is being made in the field of solar panel manufacturing,

Designs with extremely low mass could likely to achieve a kilogram per kilowatt i.e. 4 kilotonnes for the same 4 gigawatt capacity station. Also, the mass of overhead must be considered.

Current launch costs are not feasible for a space-based solar power station to be actualized. But, the concept of SpaceX's Starship does bring a ray of hope, for if it is realized, launch costs shall

Eventually, it will come down to a minimum of 10/kg. *We will be working and writing paper to bring down the cost in a feasible*