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THE OPPORTUNITY OF SPACE SOLAR POWER - ECONOMICALLY, GEOPOLITICALLY, AND ENVIRONMENTALLY

Abstract

In the last few years, Space Solar Power has received a large increase in international attention, development funding, and was even highlighted in the five 2025 ESA development goals. These changes are happening in parallel to multiple reports in 2021 and 2022, including from this author, that recent dramatic price reductions in the cost of launch, production of space hardware, computational capacity, and robotic assembly has made the once ludicrously expensive idea of Space Solar Power into an economically viable opportunity. While it has been technically viable for decades, now Space Solar Power has been found to be economically viable as well; it only awaits a first mover to demonstrate the technology and verify its theoretical viability.

The recent spike of funding for Space Solar Power development, including the ESA's SOLARIS project and Donald Bren's $100 million investment into research at Caltech, represents only a fraction of the money and time invested since its initial suggestion in the 1940s and refinement in 1968. The next rounds of funding required to build a demonstrator and pilot plant are already standing on a large foundation of investment and research history. Several other industries, notably solar photovoltaics, have also received billions in development in the last decade alone and have years of commercial experience and maturation which directly benefit the of building a technically and economically viable Space Solar Power project.

This paper focuses on the opportunity of Space Solar Power based on three lenses: as an economic engine, for increasing geopolitical stability, and for addressing environmental concerns and net zero targets. This analysis draws on present and historical findings from IAA Decadal Assessments and a state of industry report on Space Solar Power. Based on this analysis, this paper asserts that governments and philanthropic funding sources have a powerful opportunity to help accelerate the development of Space Solar Power with the infusion of public support, bolstered credit ratings, and limited capital. This support will help catalyze and crowd-in private capital and other large investment groups including sovereign wealth funds to finance this large energy project while minimizing the cost to the public.