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TAILORING SPACE SOLAR POWER FOR DIVERSE LOCATIONS: AN SPS-ALPHA USE CASE STUDY

Abstract

Significant new energy sources are required to meet the still-growing demand for electrical power globally – due not only to increasing efforts to transition from the use of fossil fuels to electricity, but also to the continuing growth in populations and economic activity globally. As is now well- recognized, there are limits to the use of traditional sustainable energy sources (e.g., wind energy, solar power, hydropower) because of it intermittent character – the wind does not always blow, the sun does not always shine and reservoirs are not always full. New technologies are needed urgently to meet Carbon net-zero policy goals. One such option is space solar power (SSP): the concept of harvesting solar energy in space and delivering it safely and affordably to markets on Earth. SPS-ALPHA – solar power satellite (SPS) by means of arbitrarily large phased array – is a leading candidate to accomplish SSP development and deployment in a timely and cost-effective fashion. SPS-ALPHA platforms in geostationary Earth orbit (GEO) is one particularly attractive option due to its hyper-modular and readily scalable character. However, many of the markets most in need are in latitudes far removed from the equator, while others may only be served by off-shore SSP receivers – leading to potential higher costs and difficulties in realizing the potential of space solar power.

This paper will review the requirements for new energy options as a function of location, and the possible solutions based on SSP and SPS-ALPHA. The paper will introduce some new concepts for meeting these needs, and present the results of recent analyses. The paper will conclude with an updated prospective path forward for SPS-ALPHA development and introduction into global markets.