

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

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AVOIDING GREENWASH IN REPORTING LIFE CYCLE GREENHOUSE GAS EMISSIONS OF  
SPACE SOLAR POWER: ENVIRONMENTALLY-EXTENDED INPUT-OUTPUT VERSUS  
PROCESS-BASED APPROACHES**Abstract**

As the global energy landscape seeks sustainable alternatives to fossil fuels, the concept of space-based solar power (SBSP) is beginning to be considered on an international level. In the context of SBSP's emergence as a viable and sustainable energy solution, accurate and transparent assessment of its environmental footprint is essential. This paper outlines challenges concerning some of the common narrative around SBSP and presents some guidance to the SBSP community on how to avoid falling victim to greenwash when discussing the technology. Through case studies and methodological considerations, it will then go on to explore the advantages and limitations of the two main modelling approaches in the reporting of its life cycle greenhouse gas (GHG) emissions, emphasising their applicability to the unique characteristics of developing Solar Power Satellites (SPS). In this regard, the paper will present a comparative Life Cycle Assessment (LCA) of the Innovative Heliostat Swarm and the Mature Planar Array SPS concepts from both an Environmentally-Extended Input-Output (EEIO) and Process-Based perspective to contrast their respective contributions to robust and trustworthy life cycle GHG impact assessments. Based on these results, the potential implications of integrating each of these methodologies into life cycle reporting of SPS technologies will be evaluated in order to establish a comprehensive framework for accurate and credible reporting. The findings provide valuable insights for researchers, policymakers, and industry practitioners involved in assessing and/or implementing future SPS technologies, contributing to the development of responsible and informed decision-making in the realm of SBSP.