

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

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SEEKING SUSTAINABILITY FOR TERRESTRIAL AND SPACE POWER NEEDS: A NOVEL,
MODULAR AND SCALABLE APPROACH TO SPACE-BASED SOLAR POWER**Abstract**

As today's world faces great environmental challenges, the transition to more sustainable and renewable sources of energy is a mandatory effort for the long-term future. Knowing that the Sun irradiates the Earth with more energy in a single day than humanity's need for an entire year, a logical idea would be to attempt grabbing a portion of this virtually infinite and free supply directly in space. Space-Based Solar Power (SBSP) is not a new concept in the space industry: In fact, concepts for orbital power plants have existed since the very first years of the space race, also most space vehicles and space stations are currently powered by solar panels. The abundance of this source of energy cannot be denied, but the challenges of transmitting it back to Earth, while minimizing the losses during transmission as opposed to the solar panels' efficiency, which has to be maximized, is everything but a trivial enterprise. In this study, we present the concept for a network of relatively small satellites that could provide enough energy for hydrogen electrolyzers for aircraft applications. The business model, architecture of the satellite constellation, necessary ground infrastructure and the economic feasibility of the proposed concept are discussed to evaluate the use of space based solar power to produce sustainable fuels for climate friendly aviation. By exploiting the economies of scale in the newly revitalized space industry, fostered by the flexibility of commercial launchers and the falling payload prices, the concept is supposed to fit nimbly in this booming context, providing a test-bed for space-based solar power to become a reliable and valuable asset for the upcoming green economy.