

**Energy balance of a High Altitude Platform powered by a solar-hydrogen system**

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**ABSTRACT**

High Altitude Platform's (HAP's) are quasi-stationary aerial platforms operating in the stratosphere. Providing relay services for wireless communication networks, these platforms are an alternative to increase the effectiveness of future communication. Nevertheless, HAP power subsystem is a key part that determines the implementation and feasibility of these platforms. One effective and renewable option to power the HAP, is a photovoltaic system with hydrogen storage. In this paper we present an overview of the HAP technology with emphasis in their energy subsystem. In order to obtain nominal powers of the solar-hydrogen closed loop system, an energy balance analysis is made. Conversion efficiencies of proton exchange membrane technology and the hydrogen storage capacity are used to define the optimal nominal powers. Nevertheless, power specific weight (kW h/kg) and volume (kW h/m<sup>3</sup>) are discussed. Finally, hypothetical implementation in Quintana Roo, Mexico is briefly examined.