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**Optimization of the design of hydrogen production based on
system cost**

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ABSTRACT

The production of hydrogen by electrolysis using a photovoltaic generator as a source of electricity is evaluated for the site of Algiers, Algeria. The PV power to electrolyzer power ratio was assessed, a ratio analogous to the inverter load ratio (ILR). For the ILR the inverter manufacturers recommend 1.1 to 1.2 depending on the site. For a given electrolyzer characteristics, the photovoltaic generator characteristics and size were varied to optimize the system. The main optimization criterion is cost. The cost of hydrogen production per unit volume was minimized. The optimum power ratio varies mainly between 1.4 and 1.45 in Algiers, Algeria. However, it was noticed that this ratio decreases in some cases to 1.1 for only a few number of photovoltaic generators. These PVGs are very interesting and give a reduced cost of hydrogen production. By making a judicious choice of PVG, it is possible to reduce the cost by 12%. By increasing the power ratio, it is possible to increase the production of the system, a 10% increase lead to increase the cost by only 0.1%.

Keywords: electrolysis, hydrogen production, Optimization, photovoltaic.

