

Study, Design, Construction and Supervision of a Hydrogen Production System Using Photovoltaic Renewable Energies

**Ilias Atmane^{1,*}, Mohammed Rhiat¹, Mohammed Karrouchi¹, Anas Hassari¹,
Mostapha Melhaoui², Kamal Hirech¹**

¹Higher School of Education and Training, Mohammed First University, Oujda, Morocco

²LSEET Laboratory, Faculty of Sciences and Technics, Marrakech, Morocco

Email address:

i.atmane@ump.ac.ma (Ilias Atmane), mohammed.rhiat@ump.ac.ma (Mohammed Rhiat),
m.karrouchi@ump.ac.ma (Mohammed Karrouchi), a.hassari@ump.ac.ma (Anas Hassari),
melhaoui.m@gmail.com (Mostapha Melhaoui), k.hirech@ump.ac.ma (Kamal Hirech)

*Corresponding Author

Abstract

In this work, we show the feasibility of using renewable energies, in particular photovoltaic systems, to produce hydrogen in order to meet energy needs while reducing greenhouse gas emissions. In this context, and in order to harness the saline water from Douar el Hamri (located 80 km north-west of Oujda), characterised by a conductivity of 4,000 $\mu\text{S}/\text{cm}$ and a salinity level of over 2g/l, we have designed a system consisting of a 345 W PV panel and a boost-type DC/DC converter that feeds stainless steel electrolyzers to break down the saline water into hydrogen and oxygen using electrolysis. This process produces 'green' hydrogen, a clean energy source that can be used by the Douar's inhabitants to run their generators and generate electricity. When the system is switched on and under lighting conditions of 1000 W/m^2 , the first results show the appearance of a significant quantity of hydrogen and oxygen. Compared with traditional methods of producing hydrogen, this approach offers advantages in terms of sustainability, reducing the carbon footprint and contributing to the energy transition to renewable sources.

Keywords

PV, Climate Change, Water, Desalination, Photovoltaic