

Accepted Manuscript

Long-term performance analysis and power prediction of PV technology in the State of Qatar

Farid Touati, Noor Alam Chowdhury, Kamel Benhmed, Antonio J.R. San Pedro Gonzales, Mohammed A. Al-Hitmi, Mohieddine Benammar, Adel Gastli, Lazhar Ben-Brahim

PII: S0960-1481(17)30582-7

DOI: [10.1016/j.renene.2017.06.078](https://doi.org/10.1016/j.renene.2017.06.078)

Reference: RENE 8945

To appear in: *Renewable Energy*

Received Date: 25 December 2016

Revised Date: 18 June 2017

Accepted Date: 21 June 2017

Please cite this article as: Touati F, Chowdhury NA, Benhmed K, San Pedro Gonzales AJR, Al-Hitmi MA, Benammar M, Gastli A, Ben-Brahim L, Long-term performance analysis and power prediction of PV technology in the State of Qatar, *Renewable Energy* (2017), doi: 10.1016/j.renene.2017.06.078.

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



1 **Long-term performance analysis and power prediction of PV technology**
2 **in the State of Qatar**

3

4 **Farid Touati, Noor Alam Chowdhury, Kamel Benhmed*, Antonio JR. San Pedro Gonzales,**
5 **Mohammed A. Al-Hitmi, Mohieddine Benammar, Adel Gastli, and Lazhar Ben-Brahim**

6

7 Department of Electrical Engineering, Qatar University, Doha 2713, Qatar

8 Email: touatif@qu.edu.qa, noorc07@gmail.com, kamelbenhmed@gmail.com,

9 antoniojr.gonzales@qu.edu.qa, m.a.alhitmi@qu.edu.qa, mbenammar@qu.edu.qa,

10 adel.gastli@qu.edu.qa, brahim@qu.edu.qa

11 * Correspondence: kamelbenhmed@gmail.com; Tel.: +974-66-895-532.

12 **Abstract:** “Solar photovoltaic (PV) energy in GCC”- the term seems convincing to many
13 solar PV industries due to high solar exposure in GCC region. However, long-term effects
14 such as dust accumulation and seasonal variation are major drawbacks for solar PV
15 energy. This research aims to investigate PV performance for two years in the harsh
16 environment of Qatar. For data collection, a wireless system has been developed to record
17 critical parameters such as solar irradiance, relative humidity, ambient temperature, PV
18 module temperature, dust, wind speed, and output PV power. Results show that due to
19 panel dusting for eight months, the PV output power decreased by 50%. Also, owing to
20 lower ambient temperatures, clearer sky and cleaner panels due to occasional rainfall, the
21 PV panels show higher output power in Winter than in Summer season. Besides, within
22 one-month, a cloudy condition in Winter causes 20% drop in average output power.
23 Therefore, a strategic plan is needed to build and manage efficiently a PV solar plant in
24 harsh environments such as of Qatar. Energy management requires prediction of energy
25 yield. To this end, using machine-learning, a mathematical model has been established
26 which can predict the output power from PV panels under different environmental
27 conditions.

Download English Version:

<https://daneshyari.com/en/article/4926086>

Download Persian Version:

<https://daneshyari.com/article/4926086>

[Daneshyari.com](https://daneshyari.com)