UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

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Determination of energy yield for multi-MW photovoltaic power stations

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Abstract content
   (Max 300 words)

The renewable energy bidding programme (REBID) of the Department of Energy (DOE) has made the establishment of renewable energy power plants a reality and the planned construction of the first plants is already in an advanced stage. Several multi-MW Photovoltaics (PV) plants are planned, with 18 projects allocated preferred bidder status totalling 630 MW in the first round. The capacity of the proposed PV power plants ranges from 5 MW to 75 MW. Planning such projects involves many processes ranging from technical to financial. The determination and verification of the energy yield at various exceedance levels is a crucial step in the process as the DOE requires a 20-year energy yield forecast. Financing of the project is also dependent on the energy yield at various exceedance levels, typically P90 or P95. In order to calculate the energy yield of a PV plant the local solar resource and its variability needs to be taken into account. The PV technology and balance-of-system components to be employed need to be fully specified. In addition, appropriate PV technology and site dependent loss and degradation mechanisms need to be applied. This paper discusses the process of determining an average energy yield for a 5 MW PV power plant based on the solar resource at a given site and applying appropriate loss and degradation mechanisms. Forecasting of P90 or P95 energy yields for a required 20-year period based on uncertainty analyses is also discussed.

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Primary author: Prof. VAN DYK, Ernest (NMMU)

Co-author: Dr VORSTER, Freddie (NMMU)

Presenter: Prof. VAN DYK, Ernest (NMMU)

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