

Does Lesotho have solar energy potential?

This study represents the first assessment of solar photovoltaic and wind energy potential production over Lesotho at high horizontal resolution (1 km), based on the state-of-the-art atmospheric model WRF.

How to estimate wind power potential over Lesotho?

Wind and Solar Resources Estimation In order to estimate the photovoltaic and wind power potential over Lesotho, the Weather Research and Forecasting (WRF) numerical model was used. In particular, a specific augmentation of WRF, the WRF-SOLAR was adopted, which is based on version 3.6 of WRF-ARW.

Can a high resolution model predict wind and photovoltaic energy resources in Lesotho?

In this context the model was applied at high horizontal resolution (1 km) over Lesotho covering a temporal period of 30 years, from 1989 to 2018, to provide a robust estimation of wind and photovoltaic energy resources. 3.1.1. Modelling Setup and Data

How was the photovoltaic power potential map produced for Lesotho?

The photovoltaic power potential map for Lesotho was produced using WRF Sim2hourly values of normal, direct and diffuse solar radiation, 2 m temperature, 10 m wind and albedo. As for the wind energy assessment, the use of an hourly model output allowed us to take into account diurnal variability of the involved physical quantities.

What are the main energy sources in Lesotho?

The major internal energy sources in Lesotho are biomass, in all forms, and hydropower. Fossil fuels are totally imported from South Africa. Lesotho imports about 40% of electricity to meet the electricity demand [14,15], while considering the overall energy balance the dependency rate exceeds 60%.

What are the development objectives of the Lesotho energy sector?

More in general, the development objectives of the Lesotho energy sector are in line with the 2030 Agenda for Sustainable Development, adopted by the United Nations Member States in 2015.

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With the abundant renewable energy sources in Lesotho, independent power producers could be incentivized to erect solar PV plants and wind farms to increase local energy security at lower cost and diversify utility's power mix.

Concerning the photovoltaic potential, Lesotho presents a good potential countrywide, having values ranging

from around 1600 kWh/kWp to 1750 kWh/kWp, with maxima in the highlands. The results also show that there are many promising areas for wind power exploitation.

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In order to find the best model configuration over Lesotho for PV and wind energy potential assessment, three different combinations of some relevant parameterisations, influencing either the solar radiation and the wind have been set, to produce three different simulations for the test year 2015, hereafter named as Sim1, Sim2 and Sim3 ...

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Opportunities exist for investors to supply renewable energy products or to develop renewable power generation in Lesotho. Currently the major exploits found in the country for renewable are Hydro energy, Solar energy and Wind energy

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