

<div class="df\_qntext">Do solar/wind hybrid generation systems and energy storage capacity affect LCOE?

The costs of energy storage capacity have a significant influence on the LCOE. Therefore, this work studies the effect of solar/wind hybrid generation systems and energy storage capacity on the LCOE. A base case of the region of De Aar in South Africa was selected because this inland location has excellent wind and solar resources.

<div class="df\_qntext">What is the correlation between solar energy output and wind energy output?

For wind to energy output correlations, the Vestas V82 1.65 MW wind turbine is modeled as a representative and conservative system of inland wind farms. (42) A linear correlation between solar radiation and PV output at 15% efficiency is assumed for the PV generation capacity.

<div class="df\_qntext">What is the net capacity factor of a battery and AE-HB?

Here, it was observed that, when the system is designed to utilize 100% of the peak capacity of renewable energy, the net capacity factor of the battery and AE-HB is essentially independent of the fraction of solar PVs in the grid.

<div class="df\_qntext">Can hybrid solar and wind solutions reduce LCOE?

Employing hybrid solar and wind solutions for the energy generation has shown great promise for reducing the LCOE in combination with green ammonia production using conventional HB in isolated regions in Argentina and Chile.

<div class="df\_qntext">Which reanalysis database is used for South Africa's weather pattern data?

The ERA5 Reanalysis database from the European Union (EU) project Copernicus (34) has been used for the weather pattern data from South Africa, with 3 years of data used (2019-2021). Data from the South African utility company Eskom Holdings SOC has been used for the demand profiles. (40) The demand curves for 2021 are used in this case.

<div class="df\_qntext">What is the difference between a full wind farm and a solar grid?

This can be explained by the difference in the required average AE-HB load and maximum load capacity obtained for each scenario. At the same time, in Figure 7 a, one can note that the lowest LCOE is achieved at 63% solar in the grid at 30% design capacity, whereas a full wind farm grid is the cheapest option at 100% design capacity.

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