

West Africa flexible direct current including wind solar storage and transmission





Overview

The power generation mixes for 2015 in Fig. 1a were based on historical data^{30,32} adapted to allocate electricity exports to the generating country. The targets for renewable resources in Fig. 1b were t.

Can smart management of hydropower plants support grid integration in West Africa?

We demonstrate that smart management of present and future hydropower plants in West Africa can support substantial grid integration of solar and wind power, limiting natural gas consumption while avoiding ecologically harmful hydropower overexploitation.

What is the West African renewable power database (warpd)?

The database of the present and future hydro, solar and wind power projects in West Africa developed for this work is named the West African Renewable Power Database (WARPD). It combines information from existing databases, scientific papers, technical project descriptions, newspaper articles and tender documents for future projects.

What percentage of West Africa's electricity is generated by hydropower?

Hydropower provides 20% of West Africa's electricity with the remainder mostly generated from natural gas and oil ³⁰, and thus currently accounts for nearly all of its RE. In a few countries, hydropower dominates the generation mix (Fig. 1a).

What role does hydropower play in West Africa's national energy strategies?

Hydropower's established role and the diversification towards other renewables are both reflected in West African national energy strategies ³².

What is the priority of renewable resources in West Africa?

a, b, Prioritization of renewable resources in West Africa as suggested by countries' current policy (a) and the power pool scenario (b). Prioritization under current policy is defined by which resources would account for more



than 90% of a country's planned RE generation by 2030 (Fig. 1b).

Are hydro-solar-wind synergies important for West Africa's renewable potential?

We show that pooling regional resources and planning transmission grid expansion according to spatiotemporal hydro-solar-wind synergies are crucial for optimally exploiting West Africa's renewable potential.



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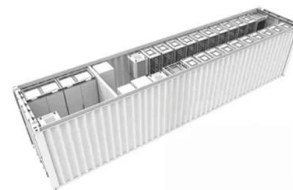
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As intermittent resources, wind and solar bring with them special requirements--for storage, for backup generation, for extensive transmission and distribution networks, and for ...

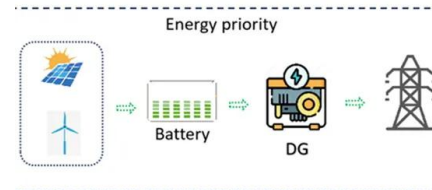
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FLEXIBLE SETTING OF MULTIPLE WORKING MODES



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[ECOWAS Master Plan for the Development of](#)

ECOWAS Master Plan for the Development of Regional Power Generation and Transmission Infrastructure 2019 - 2033 Presentation by West African Power Pool Abidjan, February 28, 2019

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West Africa has abundant renewable energy resources - including solar, wind and hydropower - that could be leveraged for regional integration and economic development.

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1.2 North Africa's solar energy resource North Africa Morocco, Algeria, Tunisia, Libya and Egypt have great potential for solar thermal power generation. The total annual solar radiation in ...

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No container design
flexible site layout



Cycle Life
≥ 8000

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200kwh

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IP55

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[Smart mixes of solar, wind and hydropower in West Africa](#)

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