Energy storage research and development mogadishu

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The Ministry of Energy and Water Resources (MoEWR) of Somalia has issued a competitive tender for the provision of solar and storage technology at 46 different sites in the capital Mogadishu.

The government department is seeking bids for the design, supply, installation, testing and commissioning of hybrid/off-grid solar PV plants with battery energy storage systems (BESS) at the sites in the Banadir Regional Administration (BRA).

Banadir covers the same area as the capital of Somalia, Mogadishu, and the 46 sites are all education facilities in the city. The projects will include two years of operations and maintenance (O& M) services with the possibility of contract extension.

The deadline is 1 August, 2024, and bids need to be sent physically to the interim project coordinator’s address, which is in the tender documentation on the MoEWR website here.

The tender document specifically calls for lithium-ion BESS technology alongside monocrystalline or polycrystalline PV modules. The 46 projects range from a minimum of 250kW PV and 100kW/800kWh of BESS at the high end to a minimum of 16kW PV and 20kW/50kWH BESS at the low end.

The projects are part of the goverment’s Somalia Electricity Sector Recovery Project (SESRP), launched in 2022. The World Bank-funded project aims to increase access to sustainable and clean energy through private sector participation in Somalia, the Bank said.

Yonis Khalif Elmi, Mehmet ?enol, Mehmet Ku?af; Optimizing separate and combined grids for cost-effective hybrid renewable energy electrification in Mogadishu, Somalia. AIP Advances 1 January 2024; 14 (1): 015331. https://doi /10.1063/5.0179074

Therefore, researchers and policymakers propose that renewable energy (RE) is the key to addressing global warming and reducing electricity costs. Due to concerns about the climate change and the economic feasibility, numerous studies have been conducted worldwide, including in Asia,3-8 Europe,9-12 the Middle East,13-17 and Africa,18,19 to explore the potential of renewable energy sources.

Martinez-Rico et al.24 conducted multi-objective optimization of production scheduling using particle swarm optimization (PSO) for a hybrid renewable energy (HRE) system in Spain. The authors proposed a method to optimize a HRE system with batteries, considering profit and battery value loss. This approach effectively prolongs battery lifespan and reduces electricity generation expenses. However, the research emphasizes that day-ahead market arbitrage yields limited profits due to minimal price disparities between hours.

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This study makes several novel contributions.First, it is among the first to optimize separate and combined grid designs for hybrid renewable energy systems in Mogadishu, Somalia. Despite being severely impacted by climate change, Somalia has seen limited research on renewable energy solutions tailored to its context.

Third, the analysis compares optimized configurations across individual grids and an integrated city-wide grid to determine the most suitable architecture. Finally, different hybrid system designs" economic and environmental trade-offs are systematically evaluated under Somalia"s specific conditions.

Therefore, this study makes key innovations in optimizing separate and combined grid architectures for hybrid renewable energy systems under Somalia"s unique constraints. The tailored load profiles, localized configurations, and grid-level analyses provide novel insights compared to existing literature.

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