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Optimizing Renewable Energy Generation in South Africa using ARENA FlexTool

South Africa, with abundant renewable energy resources, is undergoing a significant transition as it strives to integrate renewable energy into its energy mix to meet the country's growing demands sustainably. However, the efficient utilization and integration of renewable energy sources into the grid poses several technical, economic, and regulatory challenges. This research proposes a comprehensive study and analysis that aims to optimize renewable energy generation in South Africa using FlexTool, an innovative software platform designed specifically for energy system modelling and analysis. By harnessing the capabilities of FlexTool, this study aims to develop advanced optimization strategies and decision-making tools tailored to South Africa's unique energy landscape. The study will consider various factors, grid infrastructure, and socioeconomic considerations such as the country's renewable energy potential. The outcomes of this research will provide valuable insights and recommendations for policymakers, energy stakeholders, and investors, thereby facilitating the transition toward a sustainable and resilient energy future in South Africa

Keywords: Renewable energy, Irena flex tool, solar energy, biomass, wind energy, hydro energy, nodes and scenarios.

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