African Mining Law and Policy (Law/Mining/Policy crossover)

Carbon Capture, Utilization, and Storage Potentials at Fossil Fuel Plants in Kenya,

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Published: 16 October 2009 | **Received:** 12 June 2009 | **Accepted:** 18 August 2009

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DOI: 10.5281/zenodo.18900195

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Abstract

Carbon Capture, Utilization, and Storage (CCUS) technologies are crucial for reducing greenhouse gas emissions from fossil fuel plants. In Kenya, these technologies have significant potential to mitigate climate change impacts. A comparative analysis of technical feasibility studies on CCUS projects across three major fossil fuel plants was conducted. Data from these sources were analysed using statistical models to estimate potential carbon capture rates. CCUS technologies showed an average theoretical potential to capture up to 80% of CO2 emissions from the studied power plants, with significant variability among different plant designs and operational conditions. While CCUS holds substantial promise for reducing Kenya's fossil fuel-related carbon footprint, implementation remains hindered by technical, financial, and regulatory challenges. Investment in research to enhance current technologies and development of supportive policies are recommended to facilitate the adoption of CCUS at these power plants. The empirical specification follows $Y = \beta_{0+\beta}^{\rightarrow} p\, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Kenyan, Carbon Capture, Utilization, and Storage (CCUS), Geosequestration, Energy Policy, Carbon Sequestration, Biomass Gasification, Renewable Integration*