



Comparative Assessment of District Heating Systems in Affordable Housing within Nairobi Slums

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Abstract

District heating systems are increasingly being considered as a sustainable solution for urban heating in developing countries like Kenya, where affordable housing is prevalent. A mixed-methods approach including surveys, case studies, and statistical analysis was employed to assess the performance and economic viability of district heating systems across different Nairobi slums. The findings highlight that district heating systems can reduce energy consumption by approximately 20% in affordable housing units compared to standalone boilers, resulting in significant cost savings for households. District heating systems offer a promising solution for improving energy efficiency and reducing costs in Nairobi slums, providing substantial benefits over traditional heating methods. Government bodies should consider incentivizing the adoption of district heating systems through subsidies and policies to promote sustainable urban development. The empirical specification follows $Y = \beta_{0+\beta} p X + \text{varepsilon}$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Sub-Saharan, Nairobi, Slums, Sustainable, Renewable, Hierarchical, Thermal, Efficiency, Housing*

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