

## Energy Scenarios for Greater Kampala Metropolitan Area towards a Sustainable 2050: A TIMES-VEDA Analysis

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**Abstract :** This study develops 4 energy scenarios for Greater Kampala Metropolitan Area (GKMA). GKMA is Uganda's capital with a population of 4.1million and a GDP growth rate of 5.8 with a nonsustainable energy management system. The study uses TIMES-VEDA to examine the energy impacts of business as usual (BAU), Kabejja, Carbon-Tax, and Lutta scenarios in commercial, industrial, transportation, residential, agricultural, and electricity generation activities. BAU is the baseline scenario with limited CO2 emissions restrictions against which Kabejja with 20% CO2 emissions restriction, a carbon tax of \$100/ton imposed in 2050 for Carbon-Tax scenario, and Lutta with 95% CO2 emissions restriction is made. The analysis suggests that if the current policy trends continue as BAU, consumption would increase from 139.6PJ to 497.42PJ and CO2 emissions will increase from 4.6mntns to 7mntns. However, consumption would decrease by 2.3% in Kabejja, 3.4% in Carbon-Tax, and 3.3 % in Lutta compared to BAU. The CO2 emissions would decrease by 8.57% in Kabejja, 55.14% in Carbon-Tax, and 60% in Lutta compared to BAU. Sustainability is achievable when low-carbon electricity is increased by 53.68% in the EMS, and setting up an electrified Kampala metro. The study recommends Lutta as the sustainable pathway to a lowcarbon 2050.

**Keywords :** Sustainability, Scenario Plannig, Times-Veda Modelling, Energy Policy Development

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