

ABSTRACT

The increasing consumption of fossil energy has become a major concern in the 21st century due to its contribution to climate change and its broad impacts on the environment, economy, and human life. This study measures the factors influencing fossil-fuel electricity consumption in ASEAN countries and the role of renewable energy. Using panel data regression analysis from 2001 to 2022, this study evaluates the impact of GDP, energy production, manufacturing output, urbanization, and trade openness on fossil-fuel electricity consumption.

The results show that GDP, energy production, and urbanization significantly affect fossil-fuel electricity consumption in ASEAN. Urbanization has the strongest impact, contributing 0.93%, equivalent to an increase in electricity demand of 84.37 kWh per capita per year for every 1% increase in urbanization, amounting to an aggregate increase of approximately 55.82 TWh per year. GDP contributes 0.19%, equivalent to an increase in electricity demand of 2613.98 kWh per capita per year, or about 1.73 PWh per year. Energy production contributes 0.15%, equivalent to an increase in electricity demand of 1.14 kWh per capita per year, or about 0.75 TWh per year.

Individual analysis shows variation among countries; for example, in Indonesia, urbanization has a very strong impact with a coefficient of 2.57, while in Malaysia, urbanization impacts at 1.93. This study emphasizes the need for sustainable energy policies in ASEAN, including increased investment in clean energy technologies and regional cooperation to achieve renewable energy targets.

Keywords: *Climate Change, Electricity Consumption, Fossil Fuels, ASEAN, Renewable Energy, Urbanization, GDP, Panel Data Regression*