



10th INTERNATIONAL WORKSHOP ADVANCES IN CLEANER PRODUCTION

“TEN YEARS WORKING TOGETHER FOR A SUSTAINABLE FUTURE”

Cities characteristics impact in GHG emissions

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Abstract

Despite technology progress, world per capita energy demand is increasing. Relying mostly on fossil fuel sources, energy production and consumption causes environmental impacts and contributes to climate change. Almost 75% of the world's energy is consumed in the urban environment. Therefore, understanding the dynamics of energy consumption in cities enables effective mitigation actions. Based on an adapted STIRPAT model, this work analyzes the relationships between characteristics of ten Brazilian cities with CO₂ emissions related to direct energy consumption. Model's results indicate that population is the most important driver for emissions (elasticity, coefficient 0.996), followed by residential emissions (0.846), and direct energy consumption (0.481). It is verified that population affluence (0.161) and electricity generation emission factors (0.017) also contribute positively to increasing emissions. Amongst the modeled variables, just technological advance (-0.216) and increasing of the attractions points density (-0.018) contribute to CO₂ emissions reduction. It is concluded that public policies, such as energy security, the use of renewable sources and the encouragement for decentralization, such as increasing attractions points, are alternatives to CO₂ emissions reduction.

Keywords: *cities, emissions, energy, planning, modeling*
