



Understanding the Impact of Property Types and Socioeconomic Factors on GHG Emissions: A case of New York City

Shambhavi Gupta¹, Rashi Sharma²

^{1,2}MPA Candidate, School of International and Public Affairs, Columbia University, New York

ABSTRACT

New York City (NYC) buildings contribute over two-thirds of the city's greenhouse gas (GHG) emissions, making them critical targets for climate action. Local Law 97 (LL97) mandates emissions reductions for large buildings, raising equity concerns, particularly for low-income, minority neighborhoods. This study examines the interplay of property characteristics, socioeconomic factors, and GHG emissions in NYC, leveraging LL84 energy benchmarking data (2020–2023), census data, and the American Community Survey. Using econometric methods such as Ordinary Least Squares (OLS) regression and interaction modeling, the research identifies emission trends and disparities across 15,846 properties. Based on the data, the study found that the healthcare, office, and residential buildings are the largest emitters, driven by their size and energy-intensive operations, with older infrastructure exacerbating emissions. Affluent areas exhibit higher emissions, reflecting larger, energy-demanding buildings. Black-majority and low-income neighborhoods individually show lower emissions but higher levels when combined, indicating nuanced interactions between socioeconomic and demographic factors. Hispanic-majority areas consistently report higher emissions, highlighting infrastructure and equity challenges. The findings emphasize the need for targeted retrofitting policies, financial support mechanisms, and equity-focused LL97 compliance strategies. By addressing emissions from high-impact property types while mitigating burdens on vulnerable communities, this study advances NYC's climate goals and social justice objectives.

Keywords: greenhouse gas emissions, climate policy, land use, property types, socioeconomic equity