

## Evolution models for urban metabolism in Bogota

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*Abstract:* The concept of urban metabolism is defined as the sum of all technological and socioeconomic processes that result in growth, energy production, and elimination of effluents, emissions, and waste. For the modeling of urban metabolism it is necessary to apply the material flow analysis (AFM), which based on the laws of conservation of matter and energy, allows to measure and systematically analyze the flows and accumulations of materials, goods, substances, nutrients, water, electricity and waste through conservation laws. The analysis of urban metabolism systems can be carried out using a steady state approach. In this case, non-linear dynamics methods and bifurcations can be applied to systems of non-linear differential equations, which can be solved numerically. The paper will show the case of the city of Bogotá, through traffic evolution and energy models.

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