CITIES AND ENERGY: CONTEMPORARY CHALLENGES

EDITORIAL

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Abstract

The phenomenon of metropolization (urban occupation that goes beyond the limits of cities) is a result of an intense urbanization process in Brazil, which led to the development of large metropolitan in Brazil, the centers such as São Paulo, Rio de Janeiro, Porto Alegre, Curitiba, Campinas, Manaus, and others. This scenario has impacted directly on levels increase of greenhouse gases, emitted by anthropogenic activities. The representative authorities got together “almost 200 countries to obtain effective actions to reduce pollutant gas emissions” (Agência Câmara de Notícias, 2021). We present a unique volume, coordinated by the researchers, Dr. Ricardo Morel Hartmann (from the Latin American University – UNILA) and Dr. Acires Dias (Federal University of Santa Catarina – UFSC). It presents research that analyzed the exergetic efficiency of important cities such as: Recife, Brazil, which presented an efficiency of 22.58%; Mexico City, Mexico (22.16%); Lima, Peru (20.9%); Santos, São Paulo, Brazil (19.70%); and Buenos Aires, Argentina (14.9%).

Introduction

The study of the current scenario of human occupations has highlighted the importance of cities in the world context, considering that according to data from the National Household Sample Survey (PNAD) 2015 indicate that most of the Brazilian population (84.72%) lives in urban areas. And only 15.28% of Brazilians live in rural areas (IBGE,

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The Southeastern Region has the highest percentage of urban population, with 93.14% of people living in urban areas. The Northeastern Region has the highest percentage of inhabitants living in rural areas (26.88%) (IBGE, 2015) (Figure 1).

Figure 1 – Percentage of population living in urban areas, by region, in Brazil, in 2015.


The phenomenon of metropolization (urban occupation that goes beyond the limits of cities) is a result of an intense urbanization process in Brazil, which led to the development of large metropolitan centers such as São Paulo, Rio de Janeiro, Porto Alegre, Curitiba, Campinas, Manaus, and others.

The advance of technology in society in all areas and the use of several equipment make easier daily personal and domestic human life, as well as commerce, industry, health, education, transport and leisure, so they have demanded an increase in electricity consume.

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to obtain effective actions to reduce pollutant gas emissions" (Agência Câmara de Notícias, 2021).

This important discussion happened at the United Nations Climate Change Conference in 2021. It was the 26th Conference of the Parties to the United Nations Framework Convention on Climate Change (COP26), which held from November 1st to December 12, 2021, in Glasgow, Scotland. In this event, the Brazilian government during the negotiation, updated its commitments with the National Determined Contribution (NDC), which means its voluntary goal of reducing pollutant gas emissions: thus, the forecast cut in emissions went from 43% to 50% until 2030. Brazil also reaffirmed its goal of climate neutrality by 2050. And, also, in “non-binding agreements around zero deforestation and 30% reduction in methane gas emissions by 2030, in addition to pacts for forest recovery” (Agência Câmara de Notícias, 2021).

The importance of electric energy for society has been recognized by every country and has been pointed out in numerous studies. At this moment, the INTERNATIONAL JOURNAL OF ENVIRONMENTAL RESILIENCE RESEARCH AND SCIENCE – IJERRS aims at contributing to this discussion by presenting this special issue that deals with ENERGY EFFICIENCY IN CITIES.

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Thus, these professors, in the first paper, have presented the theoretical bases for the THERMODYNAMIC METHODOLOGY FOR CALCULATION OF EXERGETIC EFFICIENCY IN CONTEMPORARY CITIES.

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We have the MEXICO CITY EXERGETIC ANALYSIS, by Arlene Anahi Luft, Elisandra de Oliveira Fernandes Casu, Rosalvo Junior Sell, whose work aimed at studying and analyzing Mexico City, based on “data collection consumption of fuels, solid wastes and electric energy, and calculating CO$_2$ emission and its exergetic efficiency”.

The study of Lima city, due to its relevance as a financial and economic center for the Republic of Peru, has also taken into account the increase of its population density in recent years.

Most industries in this area has generated the greatest development and the highest energy consumption, with 20.90%-exergetic efficiency and 2.71 E+7 ton-CO$_2$ emission in Lima city. Its results are different from the other cities that take part of this Andean country”. The title of this paper is THERMODYNAMIC ANALYSIS OF LIMA CITY and was presented by Jenner David Guerrero Ibañez and Julio Renato Suni Chavez.

A survey in the historical and urban context of Buenos Aires was carried out to highlight some of the most influential sectors on ENERGY ANALYSIS OF BUENOS AIRES CITY by Nuri Esperanza Sarango Sarango, Rodrigo Alejandro Flores Escalante, and Gianna Alves Maciel Cezar.

THE ANALYSIS OF EXERGETIC EFFICIENCY IN RECIFE was carried out by Pedro Vitor Silva and Rafael Figueredo, “based on consumption data for automobile fuels, liquefied petroleum gas and electrical power”. Since it was observed that the dynamics in the regional economy is associated to the services sector, or that it justifies input exergy ratio, whose gasoline and electric energy are the main exergetic vectors.

A survey of energy consumption data was carried out to highlight the most influential sectors of Santos City, among them are electricity, petroleum derivatives (Diesel oil, gasoline), ethanol and natural gas, as well as the city’s current master plan in the study ENERGY ANALYSIS OF THE CITY OF SANTOS. Carlos Alejandro Urzagasti and Nikole Teran Uruchi found out that transport is the sector with the highest energy consumption, as it was supposed to be expected since Santos has one of the largest ports in Latin America and a strong appeal to tourism.

We wish you all an excellent reading and we look forward to furthering research that will contribute to improve our cities as sustainable, fair and resilient.