



“Gheorghe Asachi” Technical University of Iasi, Romania



MATERIAL FLOW ANALYSIS BASED HOLISTIC STUDY ON ENVIRONMENTAL PERFORMANCE OF SMART CITY CHANDIGARH IN INDIA

Sayon Pramanik¹, Kushal Chandel², Saurabh Kumar Maurya^{2*}, Alakesh Manna²

¹Department of Architecture, National Institute of Technology, Raipur, Chhattisgarh-492010, India

²Department of Mechanical Engineering, Punjab Engineering College (Deemed to be University), Chandigarh-160012, India

Abstract

The paper presents the perspective of an urban material flow analysis to determine the input-output flows such as water and energy, emissions, air pollution, sewage and waste etc. to the city Chandigarh, India. The demand for resources, consumption pattern and the environmental impact as well as relationship between inflows and outflows of materials are analyzed. The available quantitative and qualitative data for city Chandigarh are used to assess and compare the materials flows trends for this city. From the analysis, it is found that Chandigarh consumed 55.68% more energy in 2015-2016 (22300.44 TJ) when compared to 2005-2006 (14324.36 TJ). The water consumption of city was also increased by 16.39 % from 88.64 million-m³ (2005-2006) to 103.17 million-m³ (2015-2016). The production of waste water was increased by 3.63 % in year between 2005-2015, whereas wastewater treatment was increased from 63.64 % (2005) to 92.8% (2015). The outcome of the present study definitely helps to formulate the strategies and policies for utilization of energy and water resources, which may improve the environmental impact for sustainable development.

Key words: emissions, environmental impact, material flow analysis, sustainable development, waste water

Received: September, 2022; Revised final: March, 2023; Accepted: July, 2023; Published in final edited form: July, 2023

* Author to whom all correspondence should be addressed: e-mail: skks.saurabh@gmail.com; Phone: +91 9120022004