

UNIVERSITI TEKNOLOGI MARA

**AN URBAN METABOLISM OF JOHOR BAHRU:
MATERIAL FLOW ANALYSIS (MFA) BASED AND
CARBON FOOTPRINT ASSESSMENT**

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In the name of Allah, The Most Gracious, The Most Merciful.

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TABLE OF CONTENTS

TITTLE PAGE	
DECLARATION BY STUDENT	I
INTELLECTUAL PROPERTIES	II
APPROVAL BY SUPERVISOR	V
ACKNOWLEDGEMENT	VI
TABLE OF CONTENTS	VII
LIST OF TABLES	X
LIST OF FIGURES	XI
LIST OF ABBREVIATIONS	XII
ABSTRACT	XIII
ABSTRAK	XIV
CHAPTER 1: INTRODUCTION	1
1.1 BACKGROUND OF STUDY	1
1.2 PROBLEM STATEMENT	2

ABSTRACT

The primary objective in studying Urban Metabolism is to indicate the sustainability of the city in respect to the interaction between input flows (such as food consumption, water consumption and electricity consumption), output flows (such as waste generation, wastewater and greenhouse gas emissions). Excessive amount of waste generation, wastewater effluent and greenhouse gas emission are major threats to the public health and ecological balance. Material flow analysis and Carbon footprint is used in this study as an approach to determine the urban metabolism framework within the Johor Bahru city. The results, which are based on the downscaled data provided by the government and related case studies, show that the Johor Bahru urban metabolism framework's input and output are balanced in the study area. The aforementioned results show that the consumption of energy material in Johor Bahru has increased in the year 2019. However, the outflows of the level of waste generation, wastewater and greenhouse gas emissions have decreased. Low carbon urban planning and other decision-making processes, are viewed as crucial feedback for enhance the material flows sustainability, efficient performance in energy usage and to reduce the dependency on non-renewable sources.

Keywords: Urban metabolism, material flow analysis, carbon footprint, sustainability

CHAPTER 1

INTRODUCTION

1.1 Background of Study

The urban metabolism analysis concept includes analysing transformation of the cities from basic consumption which included food, water, electricity as in energy, waste and emissions. The concept of urban metabolism in urban settings provides the following advantages. Urban metabolism analysis yields outcomes on the quantities of materials depletion or consumption and the generation of waste allowing for the assessment of sustainable urbanisation. Furthermore, the urban metabolism analysis concept creates the efficiency of material measurements hence indicates urban performance gaps. Urban metabolism analysis concept generates a complete process of the input and output flows through urbanised areas that relate to crucial environmental processes such as waste accumulation, groundwater depletion, and the repercussions hazardous material of chemicals and greenhouse gas emission (Kennedy et al., 2011). Urbanisation increases with the increase in income, resulting in an expanding ecological impact, notably increased greenhouse gas emissions. Excessive use of material has an impact on the ability of metropolitan regions to function, and urban expansion contributes to ecological decentralisation (G.Wan et al., 2022)