KUALA LUMPUR TOWARDS ZERO WASTE 2040

KUALA LUMPUR CITY HALL

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PREFACE

اَلسَّلَامُ عَلَيْكُمْ وَرَحْمَةُ اللهِ وَبَرَكَاتُهُ

With utmost gratitude, I am honoured to present the Kuala Lumpur Towards Zero Waste 2040 Roadmap. This framework document is a testament to the commitment of the Kuala Lumpur City Hall (KLCH) in realizing **"Sustainable Kuala Lumpur, Prosperous Citizens,"** based on 5 main focuses driving 15 Flagship Programs **(KLCH 15)**. **'Towards Zero Waste Kuala Lumpur' is Flagship Program 8** in efforts to address the challenge of sustainable solid waste management, supporting the third focus, which is **Green and Sustainable Cities.**

The theme **"20:40 by 2040"** serves as the guiding principle of this plan, reflecting Kuala Lumpur's holistic approach to tackling urban waste challenges through source reduction, reuse, and recycling. This plan sets ambitious yet achievable targets, including a **20% reduction in organic waste** and a **40% reduction in non-organic waste** sent to landfills by 2040 through various intervention activities.

I believe the success of implementing this plan requires strong cooperation between government agencies, the private sector, local communities, and every city dweller. Only through collective efforts can we achieve zero waste, ensuring environmental sustainability and the well-being of future generations.

Finally, I would like to express my appreciation to all parties who have provided cooperation and contributions in the production of this framework. May this document serve as the main guide in our actions and journey towards a **Zero Waste Kuala Lumpur by 2040.**

YBhg. Dato' Seri TPr (Dr.) Maimunah binti Mohd Sharif
Mayor of Kuala Lumpur

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ABBREVIATIONS

CIDB	Construction Industry Development Board
EPR	Extended Producer Responsibility
FGD	Focus Discussion Group
GICE	Government-Industry-Community-Educational Institution
IDB	Kuala Lumpur City Hall Training Institute (Institut Latihan Dewan Bandaraya Kuala Lumpur)
IWTF	Integrated Waste Treatment Facility
JAD	Department of Internal Audit, KLCH (Jabatan Audit Dalam, DBKL)
JIT	Department of Integrity, KLCH (Jabatan Intergriti, DBKL)
JKAS	Department of Health and Nature, KLCH (Jabatan Kesihatan dan Alam Sekitar, DBKL)
JKAWS	Department of Civil Engineering and Drainage, KLCH (Jabatan Kejuruteraan Awam dan Saliran, DBKL)
JKB	Department of Building Control, KLCH (Jabatan Kawalan Bangunan, DBKL)
JKEW	Department of Finance, KLCH (Jabatan Kewangan, DBKL)
JKKPS	Department of Culture, Arts, Tourism, and Sports, KLCH (Jabatan Kebudayaan, Kesenian, Pelancongan dan Sukan, DBKL)
JKME	Department of Mechanical and Electrical Engineering, KLCH (Jabatan Kejuruteraan Mekanikal dan Elektrikal, DBKL)
JP	Department of Administration, KLCH (Jabatan Pentadbiran, DBKL)
JPB	Department of Urban Transportation, KLCH (Jabatan Pengangkutan Bandar, DBKL)
JPEP	Department of Economic Planning and Development, KLCH (Jabatan Perancangan Ekonomi dan Pembangunan, DBKL)
JPIF	Department of Infrastructure Planning, KLCH (Jabatan Perancangan Infrastruktur, DBKL)
JPK	Department of Enforcement, KLCH (Jabatan Penguatkuasaan, DBKL)
JPKKB	Department of Community Development and Urban Wellbeing, KLCH (Jabatan Pembangunan Komuniti dan Kesejahteraan Bandar, DBKL)
JPLR	Department of Landscape and Recreation Development, KLCH (Jabatan Pembangunan Landskap dan Rekreasi, DBKL)
JPPP	Department of Licensing and Business Development, KLCH (Jabatan Pelesenan dan Pembangunan Perniagaan, DBKL)
JPPPB	Department of Project Implementation and Building Maintenance, KLCH (Jabatan Pelaksanaan Projek dan Penyelenggaraan Bangunan, DBKL)
JPPH	Department of Valuation & Property Management (Jabatan Penilaian dan Pengurusan Harta)
JPRB	Department of City Planning, KLCH (Jabatan Perancangan Bandaraya, DBKL)
JPRK	Department of Corporate Planning, KLCH (Jabatan Perancangan Korporat, DBKL)
JPSPN	National Solid Waste Management Department (Jabatan Pengurusan Sisa Pepejal Negara)
JUB	Department of Quantity Surveying, KLCH (Jabatan Ukur Bahan, DBKL)
KLCH	Kuala Lumpur City Hall (Dewan Bandaraya Kuala Lumpur)
KLTS	Kuala Lumpur Transfer Station (Stesen Pemindahan Kuala Lumpur)
KPKT	Ministry of Housing and Local Government (Kementerian Perumahan dan Kerajaan Tempatan)
MBPJ	Petaling Jaya City Council (Majlis Bandaraya Petaling Jaya)

ABBREVIATIONS

NRES	Ministry of Natural Resources and Environmental Sustainability (Kementerian Sumber Asli dan Kelestarian Alam)
NUA	New Urban Agenda
PIMRK KL 2030	Kuala Lumpur Low Carbon Society Blueprint 2030, KLLCS2030 (Pelan Induk Masyarakat Rendah Karbon Kuala Lumpur 2030)
MRF	Material Recovery Facility
PSPPA	Solid Waste Management and Public Cleaning (Pengurusan Sisa Pepejal dan Pembersihan Awam)
SWCORP	Solid Waste and Public Cleansing Management Corporation (Perbadanan Pengurusan Sisa Pepejal dan Pembersihan Awam)
UNEP	United Nations Environment Programme
Nestle	Nestle Malaysia

EXECUTIVE SUMMARY

Kuala Lumpur Towards Zero Waste 2040 is a framework document designed to guide the development of a more comprehensive action plan in the future. This document will serve as the main reference in outlining interventions, actions, and initiatives to tackle the challenges of solid waste management in a holistic way, with the vision of **achieving a Zero Waste Kuala Lumpur by 2040.**

The **'Towards Zero Waste Kuala Lumpur'** program is Flagship 8 of DBKL's efforts toward a Green and Sustainable City, aiming to reduce waste sent to landfills through various sustainable waste management initiatives.

This effort also supports and aligns with the three core values of **Malaysia Madani**, that are synonymous with caring for the **health of the earth**—**Sustainability, Well-being, and Compassion.** It is the responsibility of every person on Earth to ensure sustainable development for the well-being and harmony of the environment.

With the theme **"20:40 by 2040"**, this framework sets key targets: a **20% reduction in organic waste** and a **40% reduction in non-organic waste** sent to landfills through various **waste reduction interventions at source, reuse, and recycling**. This aims to achieve a 60% diversion of waste from landfills **by 2040.**

This framework is the result of analysis of existing policies and strategies at the Kuala Lumpur, national, and global levels, using credible secondary data as well as input gathered from stakeholder engagement sessions to integrate diverse perspectives and expertise, ensuring an inclusive, practical, and effective framework.

The framework outlines the vision, mission, goals, theme, zero waste definition, targets, and timeline for Kuala Lumpur to achieve zero waste by 2040.

To realize the vision of **Kuala Lumpur becoming a zero-waste city by 2040,** the framework also proposes **four key Strategic Pillars** that will drive various intervention projects and initiatives:

- Pillar 1: Policy & Governance
- Pillar 2: Enforcement
- Pillar 3: Infrastructure & Facilities
- Pillar 4: Government-Industry-Community-Educational Institution (GICE) Collaboration)

EXECUTIVE SUMMARY

Pillar 1 aims to strengthen existing policies and governance structures while introducing a new holistic policy to improve planning and implementation of intervention programs more effectively among all stakeholders.

Pillar 2 seeks to enhance the accountability of local authorities and other relevant agencies in ensuring that the laws and waste management guidelines are adhered to by all levels of society in Kuala Lumpur.

The focus of **Pillar 3** is on the continuous improvement of waste management infrastructure and facilities through various technological, facility, and logistical interventions to provide better services to the residents of Kuala Lumpur.

Finally, **Pillar 4** emphasizes the synergy and strategic collaboration between government agencies, the private sector or industry, the community, and educational institutions to drive activities and innovations in waste management and processing.

This framework also outlines the **Implementation Strategy** through three project categories: Quick Win Projects, Support Projects, and High-Impact Projects.

- **Quick Win Projects (2025-2030)** involve quick actions to deliver immediate results and benefits.
- **Support Projects (2030-2035)** involve collaborative initiatives with various stakeholders, such as government agencies, the private sector, NGOs, the community, and educational institutions, with a focus on gradual waste reduction through a circular economy approach.
- **High-Impact Projects (2035-2040)** are large-scale efforts that require investment in infrastructure, technology, and facilities, creating significant long-term social, economic, and environmental impacts.

Overall, this framework incorporates all the essential elements to develop a more comprehensive action plan with effective and sustainable interventions and initiatives to ensure Kuala Lumpur achieves zero waste by 2040.

1.0 INTRODUCTION

1.1 DEVELOPMENT PLAN

1.1.1 Aim

The goal of this study is to develop a **strategic framework** as an initial step that will guide the more comprehensive Kuala Lumpur Towards Zero Waste 2040.

This document will become the main reference in outlining the intervention actions and initiatives that are suitable to address the challenges of solid waste management in a comprehensive manner and achieve the goal of Zero Waste Kuala Lumpur by 2040.

1.1.2 Objective

1. Developing a comprehensive and sustainable Kuala Lumpur Towards Zero Waste 2040 framework, in line with existing policies and strategies.
2. Creating a clear vision and aspirations with targets, key strategic pillars, and a timeline to achieve the vision of Zero Waste Kuala Lumpur 2040, with appropriate interventions to reduce waste generation, thus supporting the transition towards a circular economy.
3. Examining key aspects of waste management and public cleansing by referring to best practices at the global, national, and Kuala Lumpur levels.

1.1.3 Scope

This framework includes:

- Vision
- Mission
- Goals
- Theme
- Zero Waste Definition
- Strategic Pillars
- Zero Waste Targets
- Implementation Strategy
- Timeline
- Best Practices
- Example Initiatives

This framework is developed based on existing acts, policies, and strategies at the global, national, and Kuala Lumpur levels, valid secondary data, and input from Engagement Sessions or Focus Group Discussions (FGD).

The waste considered in this framework includes domestic or household solid waste such as food waste, plastics, paper, glass, metals, textiles, rubber, garden waste, and others. In addition to domestic waste, controlled waste such as construction waste and e-waste are discussed as potential targets for zero waste by 2040.

Best practices in waste management at the global, national, and Kuala Lumpur levels, using various interventions based on waste reduction at source, reuse, and recycling, are also reported. These practices can be applied in the Implementation Strategy through three project categories: Quick Win, Support, and High Impact.

1.1.4 Methodology

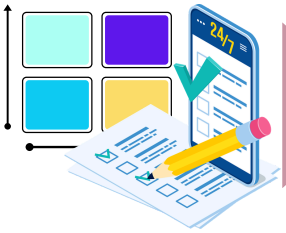
The methodology used to develop this framework follows a comprehensive and inclusive strategic approach. The process of developing this framework can be summarized as follows:

UNDERSTANDING THE SCOPE AND ASPIRATIONS

- Identifying the scope and initial aspirations.
- Identifying stakeholders and their roles in the waste management ecosystem.

FRAMEWORK DEVELOPMENT AND STAKEHOLDER ENGAGEMENT SESSIONS

- Setting the core framework (scope, goals, and direction).
- Conducting FGD with internal KLCH departments and various other stakeholders.



DATA ANALYSIS AND BASELINE ASSESSMENT

- Collecting and analyzing secondary data and current waste management practices in Kuala Lumpur.
- Analyzing key acts and policies at the national and Kuala Lumpur levels.
- Identifying the waste composition to be targeted.
- Benchmarking best practices to identify relevant global and regional zero waste initiatives relevant to the context of Kuala Lumpur.

PREPARATION OF THE FRAMEWORK FOR THE KUALA LUMPUR TOWARDS ZERO WASTE 2040

- The roadmap is developed with input from the FGD, which includes the setting of the vision, mission, goals, definitions, as well as measurable implementation strategies based on the targets of the global, national, and Kuala Lumpur frameworks..

VALIDATION OF THE FRAMEWORK FOR THE KUALA LUMPUR TOWARDS ZERO WASTE 2040

- This framework will be the main guide in outlining the appropriate intervention actions and initiatives to address the challenges of solid waste management in a comprehensive manner and achieve the goal of Kuala Lumpur towards zero waste by 2040.


ExxonMobil
TRADERS HOTEL

2.0 ZERO WASTE CONCEPT

2.1 ZERO WASTE DEFINITION

The current waste accumulation has become an increasingly critical issue, impacting the environment and public health. Therefore, the transition towards zero waste in the future is no longer an option but a necessity.

Zero waste is a **sustainability framework** initiative that focuses on reducing waste generation and maximizing resource efficiency through reuse, recycling, and material recovery. Its goal is to ensure that materials remain in the production and consumption cycle for as long as possible, thereby reducing dependence on landfills, preserving natural resources, and reducing greenhouse gas (GHG) emissions (UNEP, 2023).

In line with the circular economy approach outlined in the **Circular Economy Blueprint for Solid Waste in Malaysia 2025-2035**, waste is no longer seen as a discarded material but as a resource still holding value to be optimally utilized. This initiative presents great opportunities for innovation, industry collaboration, and community engagement in ensuring a more sustainable and resilient future.

Thus, the zero waste approach and the definition of zero waste are crucial as a guide for Kuala Lumpur's strategic goals and aspirations in diverting waste from landfills and driving the circular economy by 2040.

GLOBAL DEFINITION OF ZERO WASTE

UNEP

Zero waste refers to waste reduction **to achieve a circular economy** and minimize environmental impact [United Nations Environment Programme UNEP, 2023].

ZERO WASTE INTERNATIONAL ALLIANCE

Conservation of all resources through responsible **consumption and production; reuse and recovery of products, packaging, and materials without incineration** and no release of substances into land, water, or air that may threaten the environment or human health.
[Zero Waste International Alliance, 2018]

ASEAN

A municipal strategy **to promote zero waste** through **local governance and community engagement** [ASEAN Municipal Solid Waste Management (AMUSE)] (Alliance of Municipalities for Sustainability)

SINGAPORE

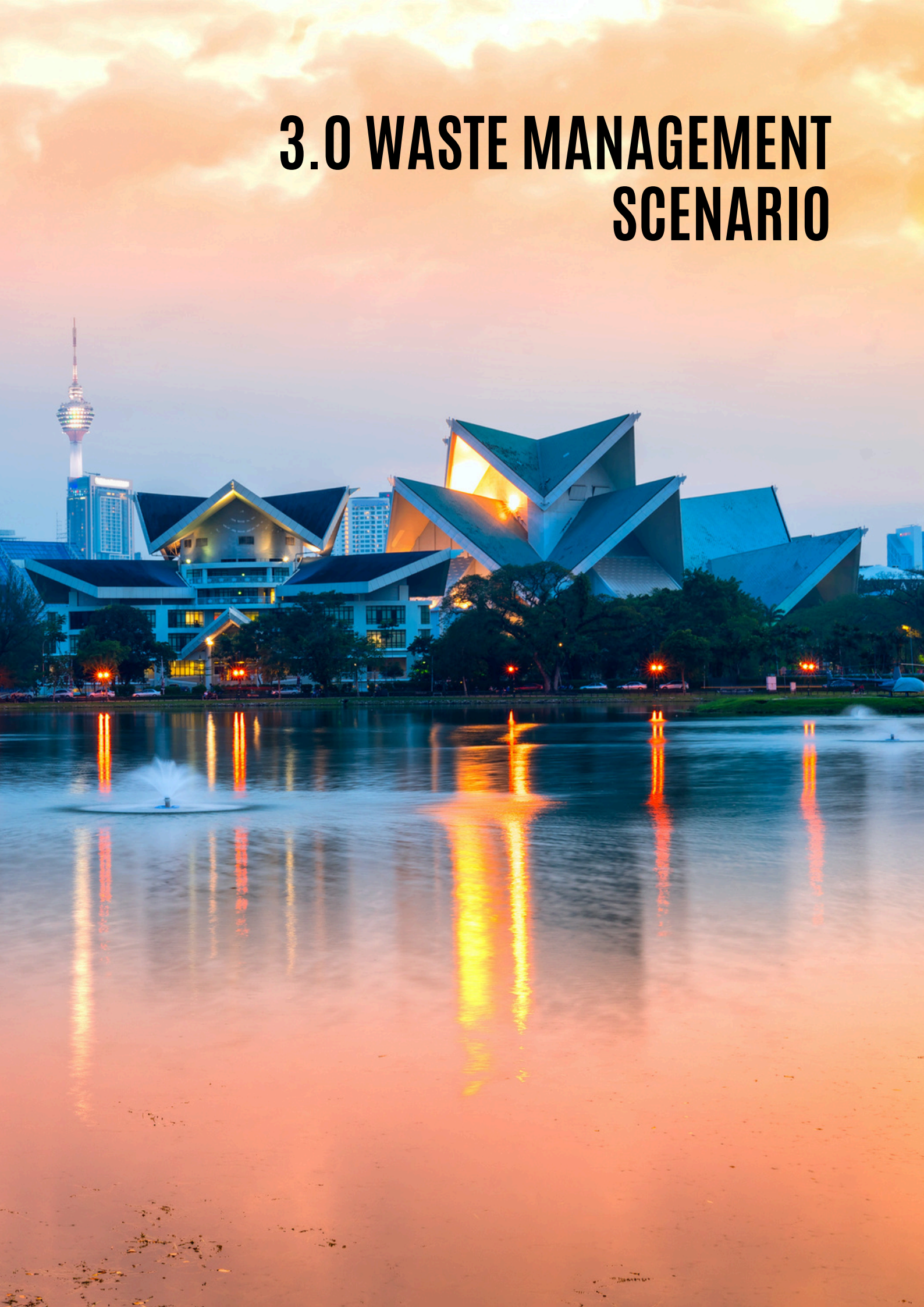
Resource management in an effort **to minimize waste** by **promoting reduction, reuse, and recycling of materials.** [Kerdlap et al., 2019]

2.2 ZERO WASTE APPROACH

AGENCY	DEFINITION	AIM
UNITED NATIONS ENVIRONMENT PROGRAMME (UNEP) **(UNEP, 2023)**	Defining zero waste as waste reduction to achieve a circular economy and minimize environmental impact.	Focusing on the global framework for sustainable consumption and production, circular economy, and climate resilience.
ASEAN MUNICIPAL SOLID WASTE MANAGEMENT ENHANCEMENT (AMUSE) (ALLIANCE OF MUNICIPALITIES FOR SUSTAINABILITY) **(AMUSE, 2022)** **(THAI-GERMAN COOPERATION , 2022)**	Emphasizing municipal strategies to promote zero waste through local governance and community engagement.	Supporting community recycling programs, local policy adjustments, and educational campaigns to change behavior.
EUROPEAN UNION **(ZWIA, 2024)** **(ZWE, 2022)**	• Zero Waste Europe defines "zero waste" as "a holistic vision and a set of principles that focus on waste prevention as well as restructuring production and consumption patterns to achieve sustainable resource use." • The EU also recognizes the zero waste definition by ZWIA.	Implementing the "European Green Deal" policy, circular economy, strict regulations on single-use plastics, and extended producer responsibility (EPR).
SINGAPORE **(KERDLAP ET AL., 2019)**	Zero waste promotes technologies to maximize material recovery and minimize waste generation.	Focusing on high-value waste processing, industrial symbiosis, and smart solutions for waste management.
ZERO WASTE INTERNATIONAL ALLIANCE **(ZWIA, 2018)**	Conservation of all resources through responsible consumption and production; reuse and recovery of products, packaging, and materials without incineration and no release of substances into land, water, or air that could threaten the environment or human health.	

Table 1: Comparison of Definitions & Zero Waste Practices

3.0 WASTE MANAGEMENT SCENARIO



3.1 GLOBAL SCENARIO

3.1.1 Global Waste Crisis

Global waste generation continues to rise with an increasingly complex waste composition, including plastic, electronic, and bio waste. Recent studies show rapid growth in global waste production due to population growth and excessive consumption patterns.

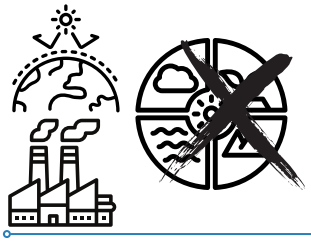
GLOBAL WASTE GENERATION

It is estimated that 2.01 billion tons of solid waste are generated each year, **with 33% of it not managed sustainably.**

2.01 BILLION

TONS OF SOLID WASTE PER YEAR

33% **UNSUSTAINABLE MANAGEMENT**



ENVIRONMENTAL IMPACT

Uncontrolled waste disposal contributes to pollution, greenhouse gas emissions, and depletion of natural resources.

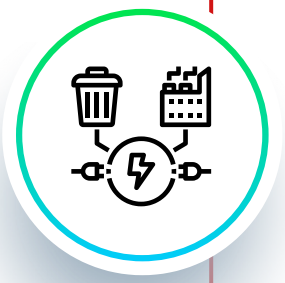
THE ROLE OF GLOBALIZATION AND CONSUMPTION PATTERNS

Globalization has accelerated the waste crisis through increased demand for products and materials that contribute to large-scale waste generation.

MAJOR TRENDS IN GLOBAL SOLID WASTE MANAGEMENT

Shift from Landfills to Waste-to-Energy Technology

More countries are shifting to waste-to-energy technology to reduce dependence on landfills, with renewable energy generation from waste incineration.

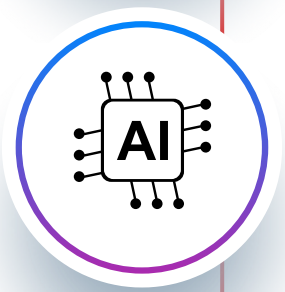


Emphasis on Waste Reduction, Reuse, and Recycling

Developed countries are now focusing on the "3R" approach (Reduce, Reuse, Recycle) to reduce the amount of waste sent to landfills and optimize resource use.

The Rise of Innovative Technologies

Technologies such as smart segregation systems, biological treatment, and electronic waste processing contribute to more efficient and sustainable waste management.



The Importance of Sustainable Waste Management in Developing Countries

Developing countries face significant challenges in addressing solid waste issues, but there is an increasing awareness and implementation of sustainable initiatives such as the development of community recycling centers and public-private partnerships.

3.1.2.Global Commitment

At the global level, the United Nations (UN) has set the Sustainable Development Goals (SDGs) until 2030. The focus of waste management objectives emphasizes the importance of responsible consumption and production, including waste reduction across the global supply chain.

Directly, the goal of Zero Waste for Kuala Lumpur **supports SDG 12: Responsible Consumption and Production,** which emphasizes sustainable resource and waste management. This includes the following targets:

- 12.3: Halving per capita food waste at the retail and consumer levels and reducing food losses along production and supply chains.
- 12.5: Substantially reducing waste generation through prevention, reduction, recycling, and reuse.
- 12.6: Encouraging the private sector to adopt sustainable practices, including circular economy approaches, and to integrate sustainability into their operations and reporting.
- 12.8: Enhancing public access to information and awareness to promote sustainable lifestyles and waste reduction at the source.

Thus, achieving Zero Waste as Kuala Lumpur's main objective is in line with SDG 2030.

The New Urban Agenda (NUA) is a shared vision for a better and more sustainable future. The commitment of 74 NUA *"encourages environmentally friendly waste management and significantly reduces waste generation by reducing, reusing, and recycling (3R) waste materials, reducing landfill waste, and converting waste to energy when waste cannot be recycled or when it provides the best environmental outcome."*

Through zero waste, cities like Kuala Lumpur can reduce pressure on landfills, minimize pollution, and improve the quality of life for urban residents. This approach also strengthens the city's ability to reduce waste to landfills by supporting new economic development through circular economy initiatives.

Overall, the zero waste goal strengthens the city's ability to become more inclusive, safe, resilient, and sustainable, as outlined in NUA 2030.

BEST PRACTICES AT THE GLOBAL LEVEL

Several major cities around the world have their own methods to ensure their residents adopt the best and most sustainable practices towards achieving Zero Waste in urban areas.

1 REUSE WASTE FOR THE CIRCULAR ECONOMY

Since 2017, the Halle 2 Recycling Center in Munich, Germany, has not only repaired used items but also played an active role in the community by collaborating with local residents and stakeholders to promote the circular economy and reduce approximately 1,000 tons of waste annually.

Halle 2 - Waste Management Corporation Munich (AWM) - The Story of Munich

2 FOOD WASTE COLLECTION FOR THE PURPOSE OF WASTE-TO-ENERGY (WTE).

In 2011, the city of Milan in Italy, with a population of 1.4 million people, adopted a comprehensive approach to the separation and collection of food waste in the city. Ten years later, after the first implementation phase that began in 2012, the city became one of the leading examples in the world in food waste collection, with 95 kilograms of food waste collected per resident and an overall collection rate of 62.6%. Milan uses anaerobic digestion processes to convert organic waste into biogas and high-quality compost for agriculture, processed at the anaerobic digestion plant in Montello.

Food Waste Collection - The Story of Milan

3 GREEN@COMMUNITY AT HONG KONG

The Green@Community initiative is a government program in Hong Kong that started in November 2020, aimed at encouraging the public to reduce waste and practice recycling. It serves as a platform to raise awareness about environmental sustainability and provides facilities for the collection of recyclable materials. A total of 500 permanent locations in community areas have been set up to receive recyclables such as paper, plastic, metal, glass, electronics, and textiles. Additionally, mobile stations have been created to serve remote areas or those with limited access to recycling collection facilities.

Individuals who contribute recyclable materials are rewarded with benefits such as reward points, which can be redeemed for various prizes. Awareness and educational campaigns are also implemented, including workshops, seminars, and exhibitions, to educate the public about the importance of recycling and reducing the amount of waste sent to landfills.

Mobile Recycling Stations - info.gov.hk

4 USED COOKING OIL BECOMES BIODIESEL

Since 1997, Kyoto has implemented a project to collect used cooking oil from households and businesses to be recycled into biodiesel. This initiative supplies biodiesel to city buses and waste collection trucks in Kyoto.

Biodiesel Station in Kyoto- copjapan.env.gp.jp

3.2 SCENARIO IN MALAYSIA

3.2.1 Waste Generation and Management in Malaysia

Malaysia is currently facing significant challenges in solid waste management, driven by rapid population growth and modern lifestyles. Throughout 2024, Malaysia generated 14.5 million metric tons of waste, which is equivalent to 39,780 metric tons per day, or 1.17 kg per person daily (Solid Waste Management and Public Cleansing Corporation (SWCorp, 2024).

The majority of the waste, more than 60%, is still disposed of in landfills. This high reliance reflects a lack of effective practices in waste reduction, recycling, and reuse. This situation not only places pressure on the existing landfill capacity but also poses environmental pollution risks.

Dependence on Landfills

Statistics from the Department of Solid Waste Management (JPSPN) show that there are:

- 165 active landfills,
- 8 sanitary landfills, and
- 3 inert waste landfills for materials like sand and concrete.

Low Recycling Rate

The recycling rate in Malaysia was approximately 37.9% in 2024, significantly lower than Singapore where the recycling rate reached 52% (NEA, 2023). Nevertheless, the Malaysian government has set a target to increase the national recycling rate to 40% by 2025, as illustrated in Figure 1.

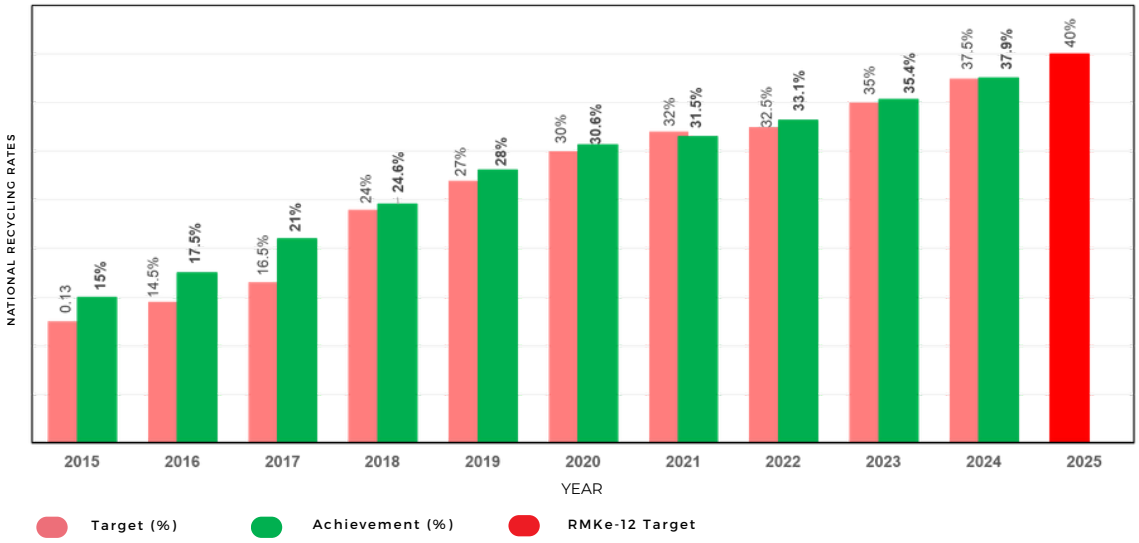


Figure 1: National Recycling Rates
Source : SWCorp, 2024

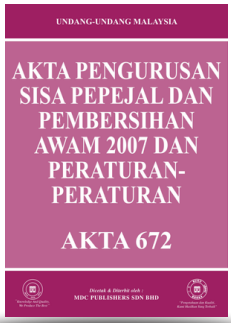
3.2.2 Acts

The management of solid waste and public cleaning in Malaysia has gone through three phases: the pre-privatization phase, the interim privatization phase, and the full privatization phase. In line with the enactment and gazetting of the Solid Waste and Public Cleansing Management Act 2007 (Act 672), the Federal Government took over the management of solid waste and public cleansing from the Local Authorities (PBT) as provided in the Local Government Act 1976 (Act 171).

In this regard, the Federal Government holds executive authority over all matters related to solid waste management and public cleansing throughout Peninsular Malaysia and the Federal Territories of Putrajaya (Haslinda & Harlida, 2015; Khan et al., 2021).

After the full privatization phase, the management of solid waste and public cleansing was taken over by the Federal Government through the Solid Waste and Public Cleansing Management Act 2007 (Act 672). This replaced the authority of the Local Authorities (PBT) in states that adopted the Act, including the Federal Territory of Kuala Lumpur.

ACT 672 DAN 673



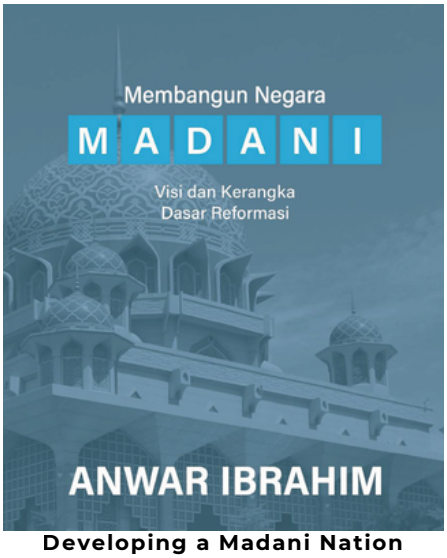
The Solid Waste and Public Cleansing Management Act 2007 (Act 672), enacted under Articles 74(1) and 80(2) of the Federal Constitution, was gazetted on August 30, 2007, and came into effect on September 1, 2011, in seven (7) states, namely Perlis,Kedah, Pahang, Negeri Sembilan, Melaka, Johor dan Wilayah Persekutuan (Kuala Lumpur dan Putrajaya).

The Solid Waste and Public Cleansing Management Corporation Act 2007 (Act 673) was also gazetted on August 30, 2007, and came into force on June 1, 2008. The enactment of Act 673 was aimed at establishing a corporation known as

The Solid Waste Management and Public Cleansing Corporation (SWCorp), which is granted the authority to administer and enforce the laws related to solid waste management and public cleansing, as well as matters associated with them.

Figure 2: Phases of Solid Waste Management and Public Cleansing in Malaysia

3.2.3 National Legislation and Policies



Developing a Madani Nation

Mid-Term Review (MTR) of the 12th Malaysia Plan.

This framework aligns with **the three core values** of Malaysia Madani that are synonymous with **the care for Earth,** namely **Sustainability, Well-being, and Compassion.** Sustainable development aims to strike a balance between economic, social, and environmental needs to achieve the well-being of both humanity and the Earth. Therefore, it is the responsibility of every individual on this planet to ensure sustainable development in order to guarantee the well-being and harmony of the environment.

The Mid-Term Review (MTR) of the 12th Malaysia Plan (RMKe-12) focuses on strengthening sustainability. Among the strategies outlined is the acceleration of the transition to a circular economy and encouraging shared responsibility in pollution prevention.

The recycling rate is targeted to reach 40% by 2025.

COMMITMENT	POLICIES	STRATEGIES RELATED TO ZERO WASTE
 **SDG Roadmap for Malaysia Phase II**	The SDG Roadmap focuses on waste management by emphasizing the construction of more integrated waste treatment facilities (IWTF), promoting increased use of renewable energy, and improving recycling rates to reduce scheduled and domestic waste. The target for household waste recycling rate set for 2025 is an increase to 40%.	Goal 8: Efficient resource management and the circular economy create new job opportunities. Goal 9: Industrial development with green technology and innovative practices in the circular economy can reduce resource consumption and pollution. Goal 11: Make cities and human settlements inclusive, safe, resilient, and sustainable. Goal 12: Ensure sustainable consumption and production patterns.

COMMITMENT	POLICIES	STRATEGIES RELATED TO ZERO WASTE
 **National Cleanliness Policy**	Aims to improve the cleanliness of the country through effective solid waste management and efficient sanitation management.	Cluster 1: Awareness of cleanliness. Cluster 2: Environmental sustainability. Cluster 3: Circular economy. Cluster 4: Governance and enforcement. Cluster 5: Quality and skilled human capital.
 **Malaysia Plastics Sustainability Roadmap 2021 - 2030**	This plan aims to accelerate sustainability and recycling towards a New Plastic Economy, with a focus on reduction, reuse, and recycling of plastic waste. The plan provides guidelines to promote sustainable business practices, ensure a sustainable plastic cycle, and align actions across the plastic value chain through a life cycle approach.	Plan Strategy: 2.3.1: Improve product design, collection, and waste sorting outcomes. 2.3.2: Develop markets and innovations to support the growth of the circular economy. 2.3.3: Build capacity for recycling processing and manufacturing recycled products at the national level. 2.3.4: Align standards, regulations, and messages across all jurisdictions.
 **National Solid Waste Management Policy 2016**	Emphasizes sustainable waste management by promoting the implementation of a circular economy through waste reduction, segregation, and reuse. The target set is to increase the recycling rate to 22% by 2020 and reduce 40% of solid waste to landfills by 2020 through material recovery facilities.	Strategic Objectives: 1. Establish integrated and cost-effective solid waste management covering collection, transportation, interim treatment, and disposal. 2. Reduce solid waste from various sectors through 3R practices. 3. Provide efficient and cost-effective services through privatization, efficient regulation, and uniform standards. 4. Utilize proven, affordable, and environmentally friendly technologies. 5. Ensure environmental sustainability and safeguard public health. 6. Strengthen legislation and institutions for solid waste management.
 **Blueprint for Circular Economy for Solid Waste in Malaysia (2025-2035)**	Transformation of the circular economy by maximizing resource efficiency and minimizing waste generation by 2050. The national recycling rate target is set at 40% by 2025.	Strategic Pillars: 1. Governance and Legislation 2. Guidelines and Procedures 3. Digitalization and Technology 4. Infrastructure and Facilities 5. Market Creation A total of 20 initiatives and 61 action plans have been outlined according to the 5 strategic pillars above, identifying the drivers and supporting agencies.

Table 2: Key National Reference Policies for Reference

3.3 SCENARIO IN KUALA LUMPUR

3.3.1 Waste Management in Kuala Lumpur

Kuala Lumpur is Malaysia's dynamic capital, growing rapidly. Covering an area of 243 $km^{2,}$ Kuala Lumpur's population in 2024 is 2.066 million (Department of Statistics Malaysia, 2024). This represents a 194.4% increase from 977,102 people in 1980 (Department of Statistics Malaysia, 2001). Rapid population growth has led to increased waste production, especially domestic solid waste.

Throughout 2024, Malaysia generated 14.5 million metric tonnes of waste, equivalent to 39,780 metric tonnes per day, or 1.17 kg per person per day (SWCorp, 2024). This figure may rise with economic activity, tourism, and seasonal events, bringing many visitors to Kuala Lumpur.

The increase in waste generation impacts management costs and environmental quality. Currently, the Kuala Lumpur City Hall (DBKL) spends an average of RM220 million annually on solid waste management and public cleansing.

This is because Kuala Lumpur does not have its own landfill due to land and location constraints. Solid waste in Kuala Lumpur is collected at the Taman Beringin Transfer Station, Kepong (KLTS) before being disposed of at the Bukit Tagar Sanitary Landfill Site, Selangor (BTSL).

Taman Beringin Transfer Station, Kepong, Kuala Lumpur (KLTS) is the only solid waste management facility operating within the Kuala Lumpur city area. The available land for opening recycling centers and waste treatment facilities is limited, given that the urbanization rate has exceeded 75%, with many areas allocated for residential, commercial, and industrial development.

According to the Kuala Lumpur Local Plan (PTKL) 2040, there are plans to develop Waste to Energy (WTE) and Material Recovery Facility (MRF) for solid waste management in Kuala Lumpur, as shown in Table 1.

Solid Waste Management Facilities in Kuala Lumpur

LOCATION	CAPACITY
1. Bukit Tagar Sanitary Landfill, Hulu Selangor, Selangor (outside Kuala Lumpur).	• 283 hectares (700 acres) • Lifespan of 100 years (>Year 2100)
2. Solid Waste Transfer Station, Taman Beringin (The existing site will be converted into a MRF location).	• 10 hectares (25 acres) • Current Capacity: 1,700 tonnes per day; • New Capacity: 2,700 tonnes per day.
3. Waste to Energy Plant, Rawang, Selangor (Outside Kuala Lumpur). (Under planning)	• 1,000 tonnes per day.
4. Proposed Material Recovery Facility (MRF) (Under planning)	• 1,000 tonnes per day.

Table 3: Solid Waste Management Facilities in Kuala Lumpur
Source: Kuala Lumpur Local Plan (PTKL) 2040

Population Density by Parliament Constituency in Kuala Lumpur

Figure 3: Population Density Map by Parliamentary Constituency
Source: Department of Statistics Malaysia, 2024

BRIEF INFORMATION

Area: **243 km²**
Parliamentary Constituency: **11**
Total Population: **2.066 million**

(Source: Federal Territory Statistics Compendium, Department of Statistics Malaysia, 2024)

The implementation of solid waste management and public cleanliness in the Federal Territory of Kuala Lumpur is currently under the administration and regulation of SWCorp, with concession services carried out by Alam Flora Sdn Bhd.

DBKL plays an important role in monitoring and enforcement within its jurisdiction. This includes conducting monitoring activities and enforcement to ensure the effectiveness of the services provided, particularly in waste management and urban sustainability.

Waste Generation

According to the Kuala Lumpur Low Carbon Society Blueprint 2030 (PIMRK KL 2030), the city of Kuala Lumpur is expected to generate carbon dioxide emissions of 1,582 $ktCO_2$ by 2030. Inefficient waste management, such as disposal in landfills and the impact of waste transportation, are among the factors contributing to these emissions. Waste not only pollutes the environment but also poses a risk to public health.

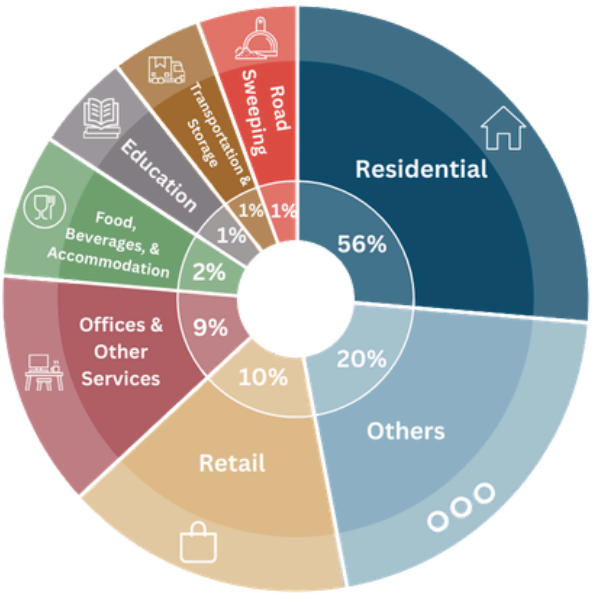
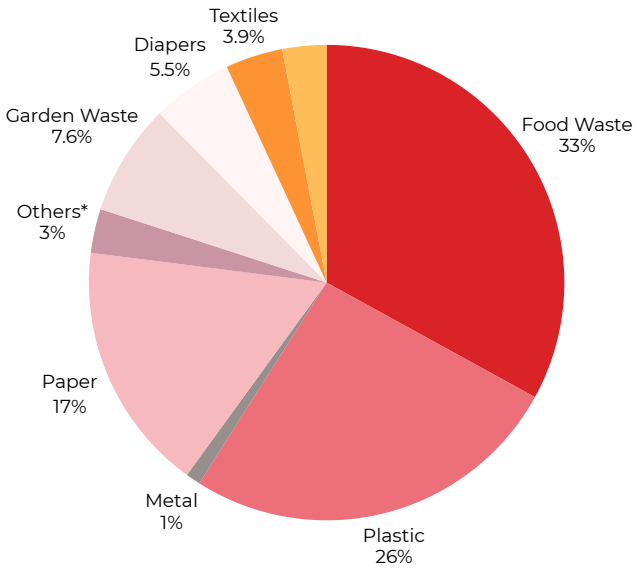


Figure 4: Solid Waste Generation by Source in Kuala Lumpur
Source: UN-ESCAP, 2020

It was found that the trend of Municipal Solid Waste (MSW) generation in Kuala Lumpur is mainly from residential waste (56%), followed by retail and wholesale (10%) and offices and other services (9%). The highest amount of waste in the "Other" category (20%) is related to recycling activities from the informal sector or household premises, which serve as collection centers for various waste (UN-ESCAP, 2020).

Waste Composition

A waste composition study at the KLTS in 2017 by SWCorp showed the waste composition for Kuala Lumpur as shown in Figure 5 (SWCorp, 2017; Department of Statistics Malaysia, 2023).
It was found that the total waste generation for the Federal Territory of Kuala Lumpur (WPKL) was nearly 800,000 tonnes, the majority of which consisted of food waste (33%), plastic (26%), and paper (17%), followed by garden waste (7.6%), diapers (5.5%), textiles (3.9%), wood (3%), and others (3%). "Others" include household hazardous waste (HHW), rubber, tetrapak, glass, mixed waste, and others. Although most of the reported waste can be reused or recycled, these waste materials are still being disposed of in landfills.



The "Other" composition includes waste such as household hazardous waste (HHW), rubber, tetrapak, glass, mixed waste, and others.
Figure 5: Composition of Waste in the Federal Territory of Kuala Lumpur
Source: SWCorp 2017; Department of Statistics Malaysia, 2023

Kuala Lumpur Low Carbon Society Blueprint 2030 (KLLCS2030)

This blueprint is a strategic framework aimed at reducing carbon emissions in the city of Kuala Lumpur. One of its main objectives is to reduce greenhouse gas (GHG) emission intensity by 70% by 2030. KLLCS2030 involves over 245 programs covering sectors such as energy, water, waste, mobility, and greening.

One of its main objectives is to reduce GHG emission intensity by 70% by 2030. It involves more than 245 programs across key urban sectors, including energy, water, waste management, urban mobility, and urban greening.

Action 8 in this plan focuses on Sustainable Waste Management, with the main objective of reducing solid waste to landfills through sustainable municipal waste management and promoting a circular economy.

A total of 14 programs are planned to achieve Action 8. Some of the planned programs include encouraging waste separation at source, promoting the use of reusable bags, and awareness campaigns such as the green school program and waste reduction campaigns within the empowerment of Act 672.

The Kuala Lumpur Low Carbon Society Blueprint 2030 (KLLCS2030)

The following are initiatives under KLLCS2030:

- **Sustainable Municipal Solid Waste Management:**

It emphasizes the need to strengthen sustainable municipal solid waste management. This initiative involves efforts to foster a zero-waste culture by encouraging practices such as sharing, repairing, renting, and reusing items. In addition, the use of eco-friendly packaging and reusable bags is also promoted. Public awareness is raised through involvement in green schools and campaigns on waste reduction and awareness related to Act 672.

In the commercial sector, recycling policies and food waste management are strengthened to reduce waste from business premises and minimize reliance on landfills.

- **Promoting the Circular Economy:**

Focuses on promoting the circular economy aimed at increasing resource efficiency and reducing waste.

Measures taken include encouraging the purchase of products made from recycled materials to support the green industry. The concept of Eco-Town development is also introduced as a step toward developing community areas based on environmental sustainability principles.

Additionally, reducing paper usage supports an eco-friendly digital transformation and reduces the overall carbon footprint. These efforts aim to create a sustainable ecosystem and drive Kuala Lumpur toward becoming a low-carbon city by 2030.

3.3.2 Current Ecosystem of Solid Waste Management

The current ecosystem of solid waste management in Kuala Lumpur is managed based on the Solid Waste and Public Cleaning Management Act 2007 (Act 672)

The transfer of responsibility for solid waste management and public cleansing from local authorities to the Federal Government was implemented through Act 672, affecting the roles of JPSPN, SWCorp, and Alam Flora Sdn Bhd as key players, with DBKL acting as the monitoring and enforcement authority overseeing policy implementation and operations at the city level.

Solid Waste Management Process Flow

1) Usage and Waste Generation

Alam Flora Sdn Bhd is appointed as the concession company to manage the collection and transfer of solid waste in Kuala Lumpur. It is responsible for ensuring that the operations run smoothly according to the set standards. The collected waste will go through KLTS before being sent to the main disposal site, which is BTSL.

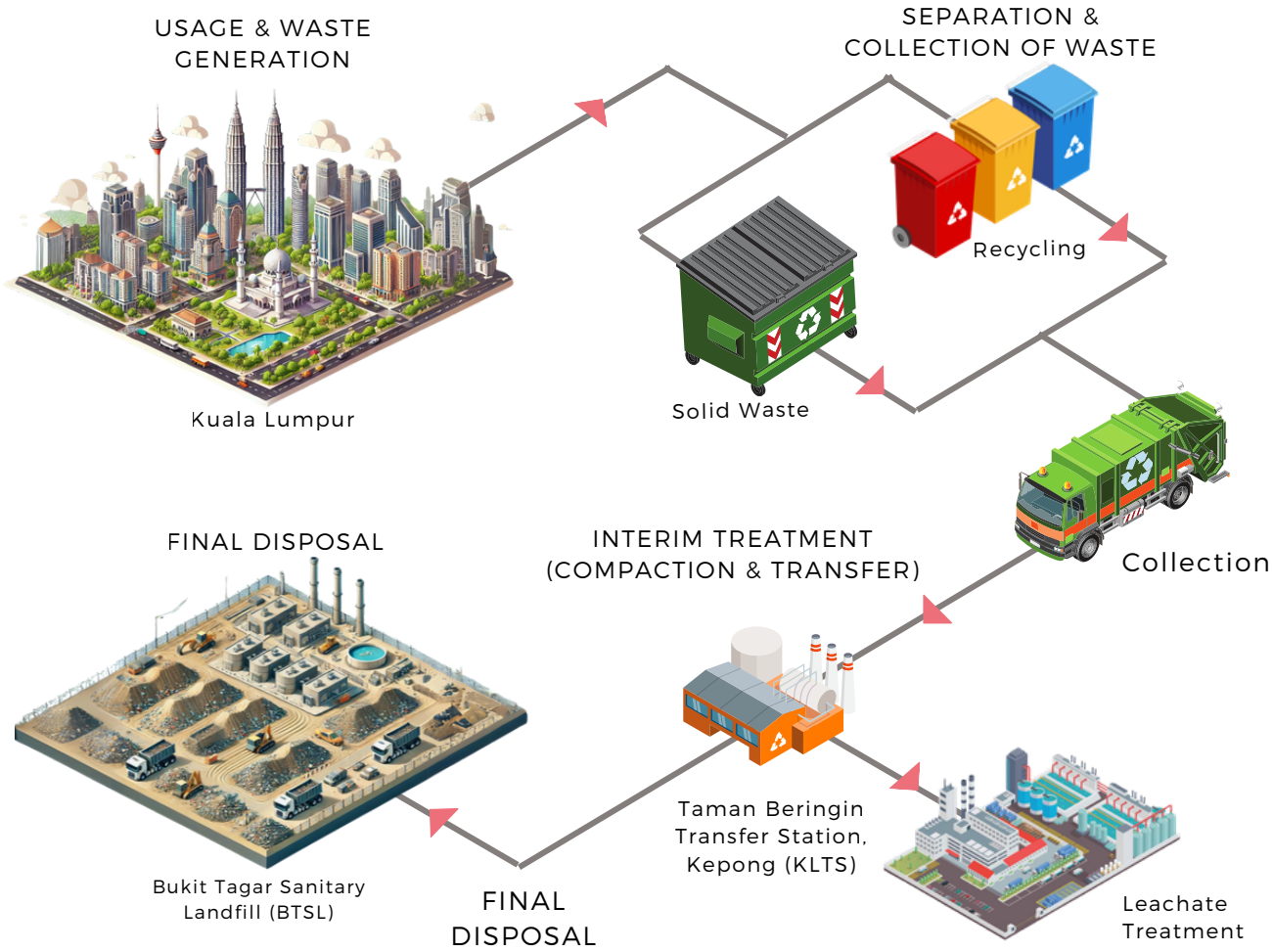


Figure 6: Overview of the Current Solid Waste Management Ecosystem in Kuala Lumpur
Source: JKAS, DBKL (2023)

2) SEPARATION AND COLLECTION OF WASTE

Activities such as road cleansing, manual sweeping, and landscape maintenance are also the responsibility of Alam Flora Sdn Bhd, with quality control of the services managed by SWCorp and DBKL.

3) INTERIM TREATMENT (COMPACTION & TRANSFER)

The waste collected is processed at KLTS before being sent to the main disposal site, BTSL. Waste collection data is shown in Figure 7. The transfer station manages municipal solid waste continuously to ensure efficient transit to BTSL within 24 hours. The solid waste received is compressed using a compactor before being transferred to BTSL. The station is equipped with a odor control system and groundwater quality monitoring. Leachate treatment is also conducted here.

4) FINAL DISPOSAL

Final disposal of solid waste in Kuala Lumpur is carried out after source separation and recycling, with residual waste compacted at the Taman Beringin Transfer Station (KLTS) before being transported to the Bukit Tagar Sanitary Landfill (BTSL). At the same time, DBKL implements recycling programmes such as 1 Community 1 Recycling (1C1R) and manages landscape waste for composting and mulching, supported by the provision of recycling facilities throughout the city.

TAMAN BERINGIN TRANSFER STATION, KEPONG, KUALA LUMPUR 2 (KLTS 2)

The Taman Beringin Transfer Station, Kepong, Kuala Lumpur 2 (KLTS 2) is the latest facility in solid waste management. Built on an area of 5.3 hectares, this station is equipped with artificial intelligence (AI) technology.

KLTS 2 will function as a high-efficiency transit hub where solid waste collected from across the city will be processed before being sent to the final disposal site. With AI technology, this station is capable of reducing manual labor and improving recycling rates by more accurately sorting waste.

Additionally, KLTS 2 will play a key role in reducing greenhouse gas (GHG) emissions by optimizing the waste management process, thus contributing to Kuala Lumpur's efforts towards becoming a low-carbon city.

This station also serves as a model for other cities in the effort to improve solid waste management through advanced technology and sustainable practices.

Waste collection data at KLTS, Taman Beringin, Kepong, Kuala Lumpur (Tons)

Year	 Domestic-Household	 Bulk Waste	 Public Cleansing Waste	 Institutions, Commercial and Industrial (ICI)	 Construction and Demolition Waste (C&D)	 SW204 Waste	 Total
2023	568,475	130,337	32,584	113,815	-	-	845,211
2024	513,705	88,553	65,837	50,347	792	-	719,234

*The data for 2024 is up to October 2024.

Figure 7: Waste collection data at Kuala Lumpur Transfer Station (KLTS) for the year 2023-2024.
Source: SWCorp, 2024

The population compared to the per capita solid waste generation ratio of the residents of WPKL

The population of WPKL increased from 1.78 million (2015) to 2.066 million (2023) (Department of Statistics Malaysia, 2024).

The per capita solid waste ratio decreased from 1.35 kg/day (2015) to 1.00 kg/day (2020) due to the COVID-19 pandemic, which reduced waste from various economic and household activities.

After 2020, this ratio increased to between 1.09–1.12 kg/day with the recovery of economic and social activities.

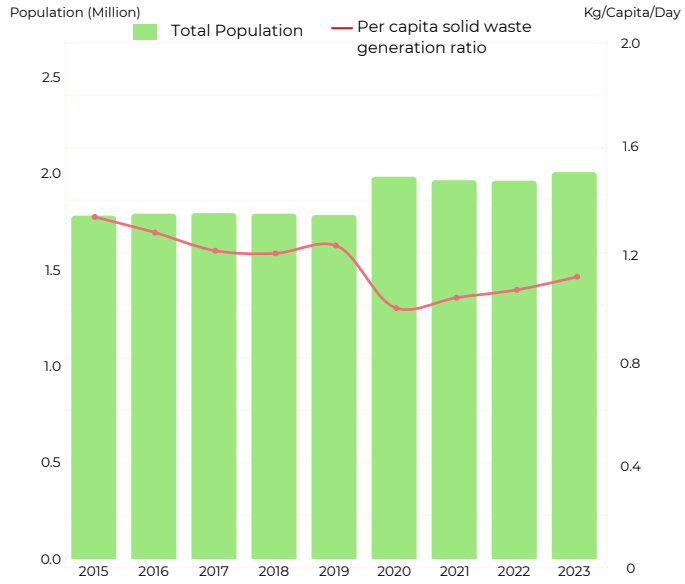


Figure 8: Trend of Per Capita Solid Waste Generation Compared to WPKL Population 2015 – 2023
Source: JKAS, DBKL (2024)

Solid Waste Generation in Relation to the Cost of Waste Management and Public Cleansing

Solid waste generation in the Federal Territory of Kuala Lumpur remained high from 2015 to 2023, with an average total of 796,000 tons per year. During this period, the cost of waste management and public cleansing consistently increased from RM200 million in 2015 to RM227 million in 2023.

The high generation of solid waste has become a burden, contributing to the rising costs of management and cleansing operations.

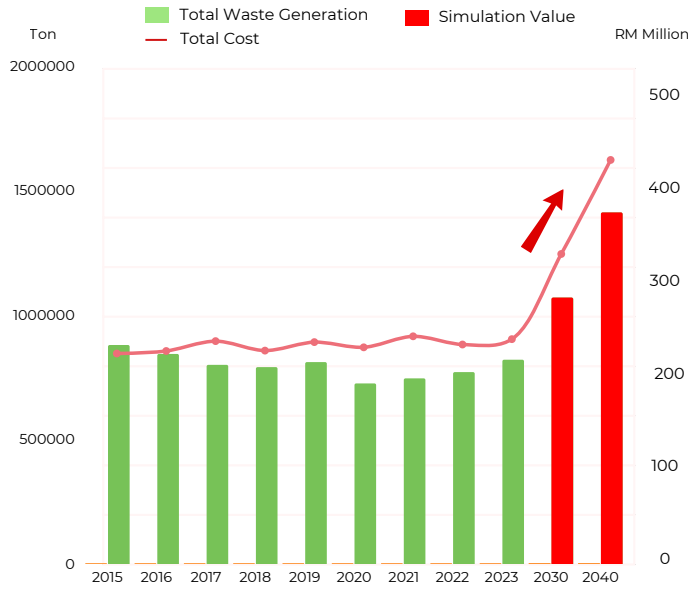


Figure 9: Solid Waste Generation and the Cost of Solid Waste Management and Public Cleansing in WPKL from 2015 to 2023 Incurred by DBKL, with Simulation Rates for 2030 and 2040.
Source: JKAS, DBKL (2024)

THE THREAT OF WASTE BY 2040

The population of the Federal Territory of Kuala Lumpur is expected to **increase at a rate of 3.0%** per year (Department of Statistics Malaysia, 2024). By 2040, the estimated population of WPKL will be **3.3 million people.**

Assuming that the residents of WPKL implement self-management waste interventions and maintain the per capita waste generation at **1.17 kg/day** (JPSPN, 2012), the total waste is estimated to reach **1,409,265 tons per year by 2040,** as shown in Figure 9.

If the cost of waste management and public cleaning remains at **RM 300/ton per year, the management costs** will reach **RM 423 million by 2040.**

The cost of solid waste management and public cleaning in the Federal Territory of Kuala Lumpur

Based on data from Department of Mechanical and Electrical Engineering (JKME), DBKL, and Berjaya EnviroParks Sdn Bhd, solid waste generation has remained consistent and high every year from 2015 to 2023.

The management costs funded by DBKL have exceeded RM200 million each year. These costs include tipping fees at the Taman Beringin Transfer Station, Kepong (KLTS), the Bukit Tagar Sanitary Landfill (BTSL), and regulatory services such as SWCorp, as shown in Figure 10.

The annual tipping fee to KLTS is an average of RM25 million, while the average tipping fee and operational cost for BTSL per year is RM39 million.

The breakdown of payments to SWCorp is estimated to be 55% for public cleansing and 45% for waste management, with an average annual cost of RM156 million. These payments remain the main contributor to the overall expenditure, accounting for more than 60% of DBKL's total waste management costs.

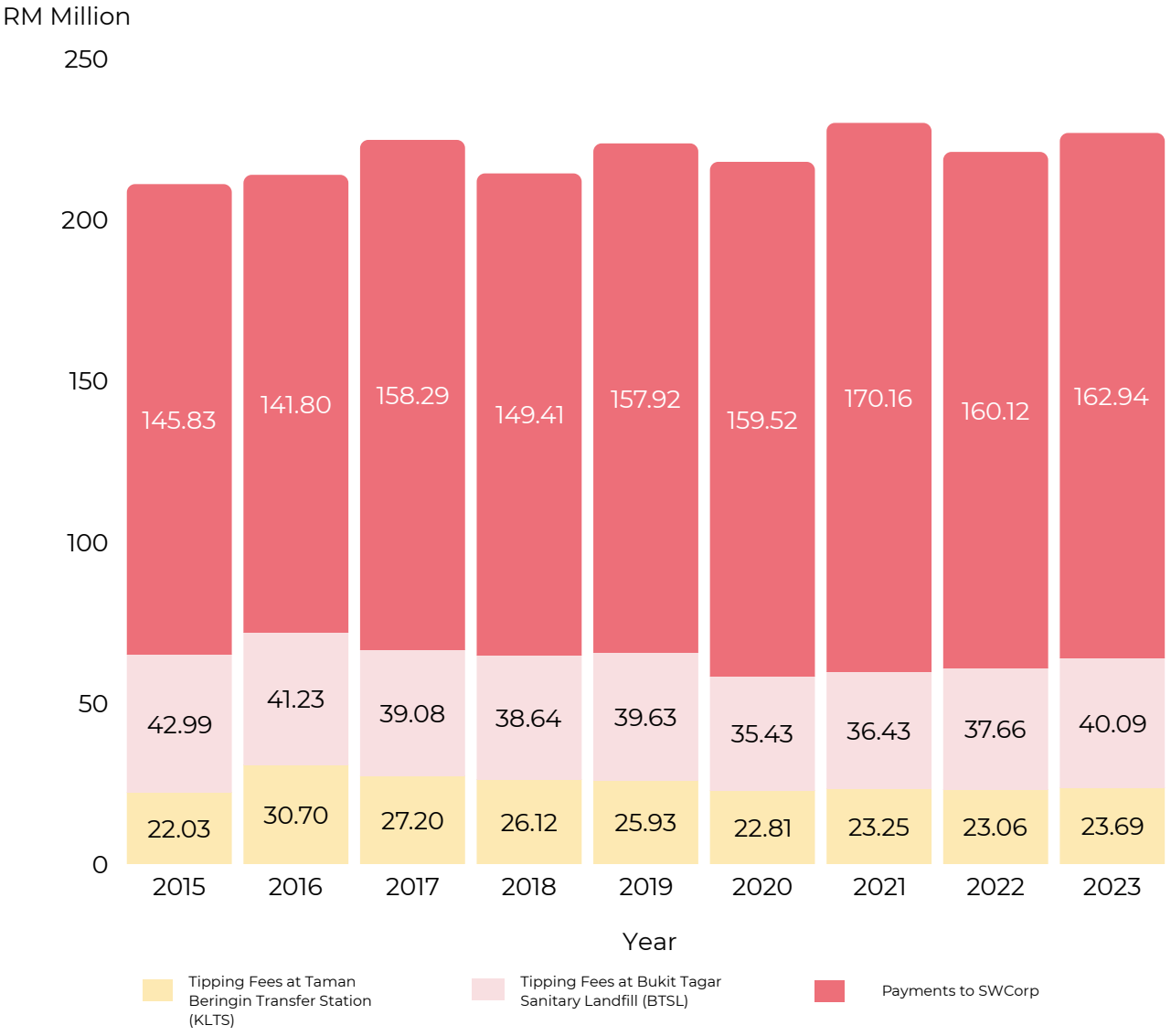


Figure 10: Trend of Solid Waste Management and Public Cleansing Costs in the Federal Territory of Kuala Lumpur from 2015 to 2023 Incurred by DBKL
Source: JKAS, DBKL (2023)

3.3.3 Legislation and Policies

Kuala Lumpur underwent a process of federalization where, starting from 1st September 2011, waste management was taken over by the Federal Government through the National Solid Waste Management Department (JPSPN) under the **Solid Waste Management and Public Cleansing Act 2007 (Act 672).**

This move aims to streamline and improve the efficiency of solid waste management, thus making Kuala Lumpur a model for a clean and sustainable city. The process also involves close cooperation between the federal government and the local authority, the Kuala Lumpur City Hall (DBKL), to ensure that high cleanliness standards are maintained in the capital city.

A Tripartite Agreement was signed between the Federal Government, the State Government, and the Local Authorities (PBT) for a period of 22 years to take over the management of solid waste and public cleansing in states that adopted Act 672.

This Tripartite Agreement was sealed between the Federal Government and DBKL on 14th September 2011 (JKAS, 2023). The renewal of this agreement is expected to take place in 2033. However, the responsibility of ensuring that Kuala Lumpur remains a clean, beautiful, and prosperous city continues to be a priority for DBKL.

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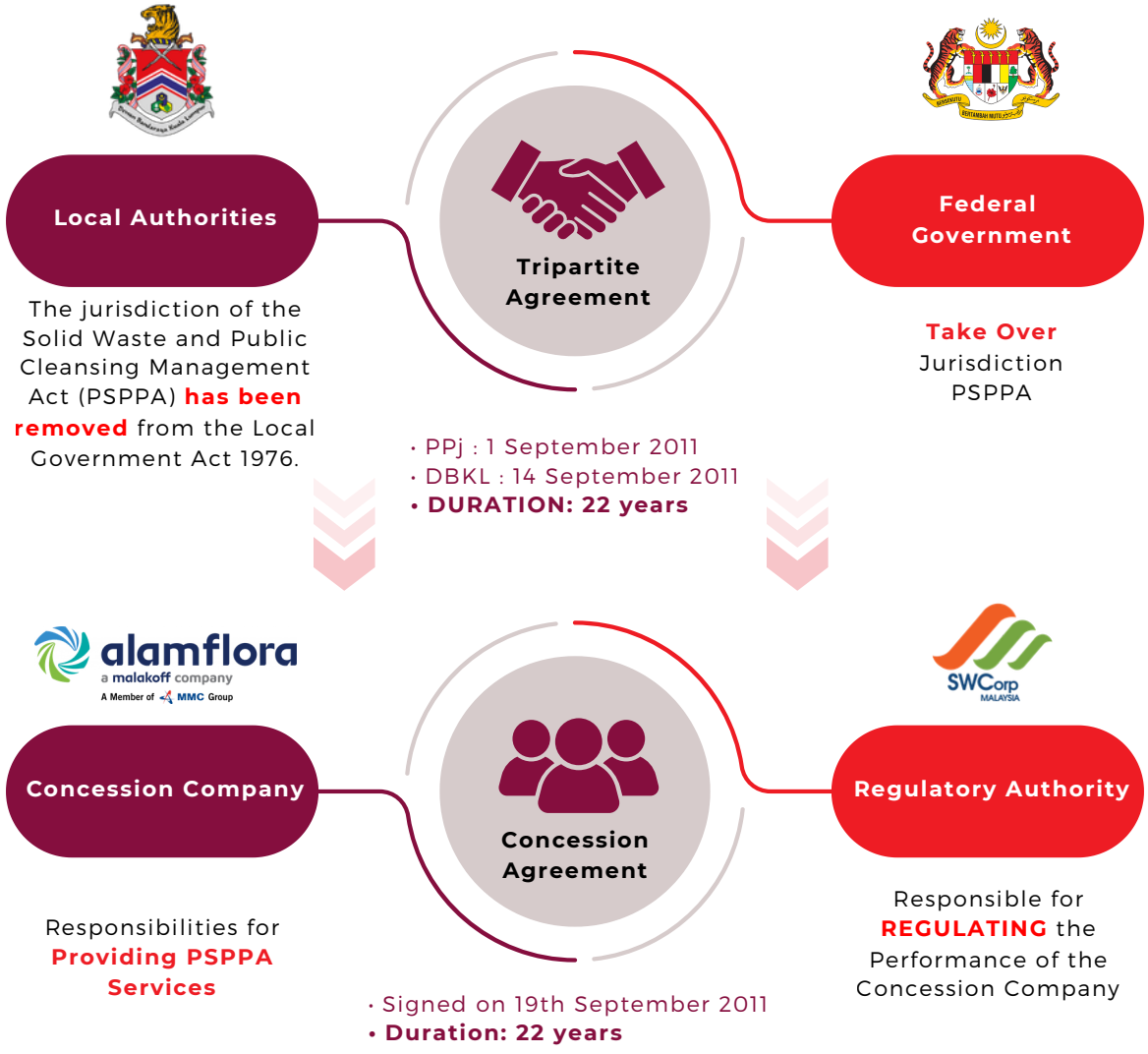


Figure 11: Solid Waste Management and Public Cleansing Model of Kuala Lumpur

3.3.4 Roles & Functions of Agencies Under PSPPA

The roles and functions of each responsible agency are as shown in Figure 12. The roles and functions of DBKL are limited to:

1. Carrying out functions under the relevant legislation
2. Assisting in the implementation of legislation and policies related to Solid Waste Management and Public Cleansing (PSPPA)
3. Contributing to the management fund - Solid Waste & Public Cleansing Management Fund

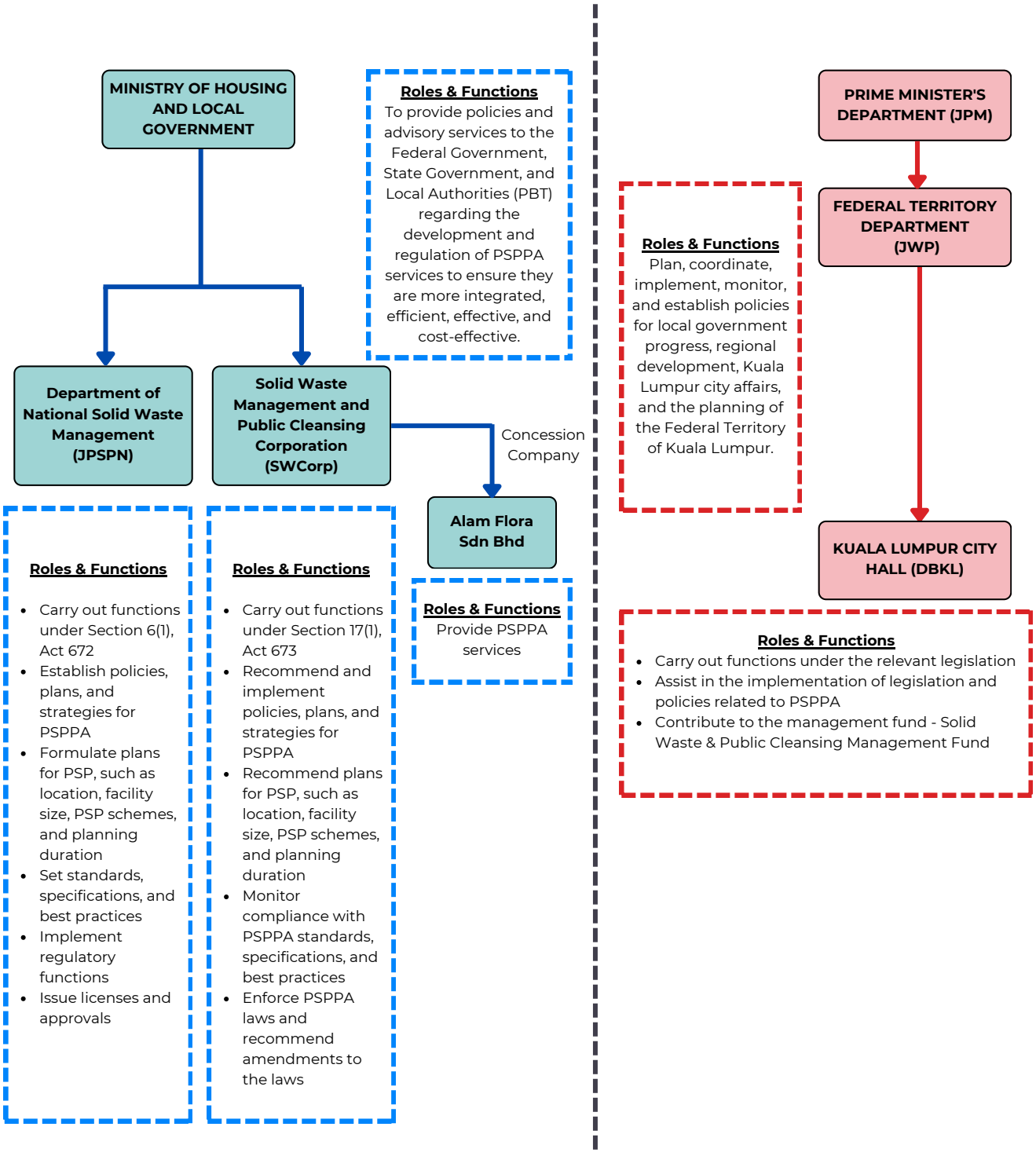


Figure 12: Roles of Responsible Agencies
Source: DBKL (2024), Federal Territory Department (2024), JKAS (2023) & KPKT (2024a,b)

3.3.5 Legislation and Policies in Kuala Lumpur

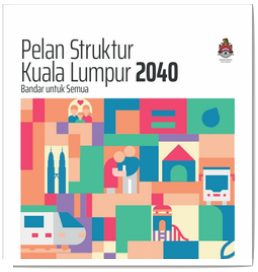
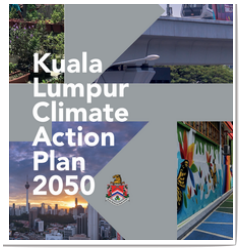
	COMMITMENT	POLICY/STATEMENT OF POLICY	ZERO WASTE STRATEGY
1	 **Kuala Lumpur 2040 Structure Plan**	Enhancing the efficiency and effectiveness of the solid waste management system, reducing waste at the source, and promoting 3R practices.	PR2.3: Strengthening Integrated and Sustainable Solid Waste Management.
2	 **Local Plan Kuala Lumpur 2040 ( )**	Encouraging innovation and collaboration for sustainable waste management solutions, including an integrated approach to waste treatment.	SP 4-4 Implementing Integrated and Sustainable Solid Waste Management.
3	 **KL Low Carbon Society Blueprint 2030**	Encouraging a circular economy with a focus on the use of renewable energy, public involvement, and the implementation of wastewater management.	4.1 Using Renewable Energy 4.4 Financing and Incentives to Promote Energy Efficiency and Renewable Energy Strategies 5.3 Public Involvement 8.1 Sustainable Municipal Solid Waste (MSW) Management 8.2 Promoting the Circular Economy (CE) 9.2 Sustainable Wastewater Management
4	 **KL Climate Action Plan 2050**	KLCAP2050 aims to reduce more than 50% of solid waste to landfills and achieve a 40% recycling rate by 2050. The strategy of this plan includes community engagement and education programs to reduce waste generation at the source, with a target of reducing domestic waste generation by 10% by 2025 through better source separation.	The Smart Waste Management Action Plan in KLCAP includes: 1. Developing the Kuala Lumpur Waste Management Master Plan (KLWMMP). 2. Engaging the community in waste reduction and management. 3. Exploring waste recycling, energy recovery, and reuse. 4. Integrating the formal and informal waste sectors. 5. Reviewing opportunities for energy generation and value from waste.

Table 4: Key Reference Policies of Kuala Lumpur.

3.3.6 Flagship Programme - DBKL 15

PRIORITY

F1: Gazette KL Local Plan
- Protects development based on a structured plan for the city.

F2: Smart City (Urban Digital Twin)
- Forms the foundation for advanced urban planning.

PLAN-LED DEVELOPMENT

F3: K2K KL
- Expanding the K2K program to all PA & PPR housing areas in Kuala Lumpur through collaboration with Think City & Urbanice.

F4: Madani Housing & DBKL Rental Homes
- Construction and rental of low-cost apartments, as well as housing quarters for DBKL staff.

F5: Sustainable Retail
- Enhancing facilities to improve the business environment and income of small traders and market vendors.

F6: Urban Greening
- Building pocket parks, green pathways, and upgrading alleyways.

INCLUSIVE COMMUNITY

F7: Renewable Energy
- Expansion of SARE to 9 suitable DBKL buildings.

F8: Towards Zero Waste KL
- Advocacy, engagement, activation, and enforcement.

F9: KL Creative & Cultural District (KLCCD)
- Enhancement of public spaces and connectivity pathways.

GREEN & SUSTAINABLE CITY

F10: Strategic Communication
- Includes crisis management, thought leadership, and branding.

F11: Strengthening Complaint Management.
- A structured approach to efficiently handling public complaints.

COMMUNICATION

F12: Mid-Term Review of DBKL ROADMAP 2021-2030

F13: Audit Task Force
- Resolving outstanding audit issues through inter-organizational collaboration.

F14: Work Culture Transformation
- Enhancing effectiveness and efficiency while ensuring staff well-being and development.

F15: Performance Dashboard & Reporting
- An integrated view of key performance metrics and financial data.

GOVERNANCE

3.3.7 Issues and Challenges

These issues and challenges are the result of an analysis conducted through Focus Group Discussions (FGD) with stakeholders, internal findings from KLCH and current data on solid waste management in Kuala Lumpur. They are categorized into several key clusters: Policy & Governance (including legal and cost-related issues), Enforcement, Infrastructure & Facilities, and Public Education & Awareness.

Each cluster highlights critical aspects necessary for formulating strategic actions to achieve zero waste in Kuala Lumpur by 2040.

BIL	ISSUE	DESCRIPTION
POLICY & GOVERNANCE ISSUES		
1	Implementation of Act 672	• Kuala Lumpur is governed under Act 672, under which jurisdiction over solid waste management and public cleansing has been assumed by SWCorp.
2	Limited options to explore alternative final disposal methods	• The agreement with the BTSL operator spans 30 years (2014-2044), limiting KLCH from exploring alternative waste disposal solutions until the contract expires. • The requirements and facilities for sanitary landfills, transfer stations, and related technologies for solid waste management and public cleansing fall under the jurisdiction of KPKT.
3	High Dependence on Landfills	• Waste generation in Kuala Lumpur continues to rise due to increased activities as an administrative, tourism, and economic hub. The frequency of cleansing is often increased, and waste must be disposed of immediately to maintain the city's cleanliness. • The absence of suitable facilities such as Material Recovery Facilities (MRFs) limits the ability to implement recycling and reuse in a comprehensive manner.
4	Lack of Holistic Policy	• There is a lack of holistic policy coordination among all relevant agencies to establish a comprehensive, integrated, cost-effective, and sustainable solid waste management system. • Insufficient policies or mechanisms to facilitate public-private sector collaboration in waste management.

BIL	ISSUE	DESCRIPTION
POLICY & GOVERNANCE ISSUES		
5	Weaknesses in data collection and storage.	• Existing data is dispersed across multiple agencies, making data collection and reporting difficult. • Data collection is inconsistent. • Without reliable data, planning for a sustainable, holistic, and well-structured solid waste management system becomes more challenging.
6	Waste Management Costs	• The cost of solid waste management includes payments by KLCH for solid waste collection, public cleansing, and waste disposal services. For solid waste collection services, KLCH pays based on the number of premises rather than the weight of waste collected. This has led to increasing costs for KLCH.

BIL	ISSUE	DESCRIPTION
ENFORCEMENT ISSUES		
1	Authority Across Agencies	• The jurisdiction, functions, and involvement across various agencies must be clear and effectively implemented. • Systematic coordination among all parties is needed for a comprehensive and effective regulatory framework.
2	Enforcement needs to be comprehensive	• Ensure that all aspects outlined in relevant policies are properly implemented. • Beyond regulation, enforcement tasks should also strengthen compliance monitoring, standards enforcement, specifications, and best practices.

BIL	ISSUE	DESCRIPTION
FACILITIES & INFRASTRUCTURE ISSUES		
1	No Materials Recovery Facility (MRF) and Construction & Demolition Recycling Facility.	These facilities are necessary to reduce the amount of waste sent to landfills. The absence of such infrastructure will hinder the implementation of circular economy strategies and urban sustainability.
2	No environmental information center, such as EcoPark.	Recycling Centers or EcoParks need to be developed as information hubs for all community levels.
3	Mobile applications and dashboards are not comprehensive enough for effective monitoring and data storage.	The existing digital systems (mobile applications and dashboards) are not fully functional or not regularly updated.
4	Special mechanisms such as Door-to-Door Collection.	These facilities are only provided at a limited number of locations, which has contributed to issues such as waste overflow.
5	Limited recycling facilities and buy-back centers.	These facilities are only available in select locations, making it difficult for the community to participate in recycling efforts.
PUBLIC EDUCATION & AWARENESS ISSUES		
1	The practice of waste separation at source (SAS), recycling, and reusing products remains low among the community.	The implementation of recycling programs and the enforcement of waste separation at source (SAS) are not comprehensive, resulting in a low recycling rate.
2	Lack of continuous awareness campaigns and engagement sessions.	Campaigns are not comprehensive across different zones, including various groups such as T20, B40, and informal housing areas.
3	Communities and individuals have a limited understanding of the importance of supporting the circular economy.	This is a major barrier to effective zero waste management and long-term sustainability.

BEST PRACTICES AT THE LOCAL LEVEL

The Kuala Lumpur Zero Waste Support Project is a collaborative initiative spanning short- to long-term efforts, involving multiple stakeholders, including the public sector, private sector, communities, NGOs, and industries. This project aims to gradually reduce waste until achieving Zero Waste status, prioritizing the principles of the circular economy.

1 DOOR-TO-DOOR RECYCLING PROGRAM

This project began in 2020, focusing on enhancing recycling practices through the role of Petaling Jaya City Council (MBPJ) in collaboration with the private sector (Nestlé Malaysia and KPT Recycle). It aims to promote waste collection for recycling, encourage waste separation habits, and increase the urban recycling rate.

Door-to-Door Recycling Waste Collection – A collaboration between MBPJ, Nestlé Malaysia, and KPT Recycle - The Star

2 DBKL CLEAN & GREEN PROGRAM INITIATIVE

This initiative aims to ensure a clean, beautiful, and healthy environment in Kuala Lumpur on a continuous basis. It involves waste management, the reuse of discarded items, and tree planting to add value to neglected areas.

Urban Neighborhood Project LA21KL - NSTP

3 1 COMMUNITY 1 RECYCLE (1C1R) PROGRAM ORGANIZED BY DBKL.

The 1C1R programme is a recycling initiative based on a barter system, whereby communities can exchange recyclable materials for essential household goods and designated public housing (PA/PPR) rental payments as determined by DBKL. The programme aims to encourage recycling practices among local communities, foster community cooperation in maintaining cleanliness and environmental quality in residential areas, create a conducive living environment, and provide incentives for city residents, particularly low-income groups.

1C1R Open Day – DBKL Facebook

4 MALAYSIA SAVE FOOD (MySaveFood)

The Malaysia Save Food (MySaveFood) Ramadan 2024 National Program was launched by the Ministry of Domestic Trade (KPDN) to reduce food waste during Ramadan. This initiative involves collecting unsold food and beverages from Ramadan bazaar vendors and distributing them to those in need. The program also collaborates with volunteers from various organizations, including Pertubuhan Pemuda GEMA Malaysia, to ensure smooth food distribution.

MySaveFood Program - mkn.gov.my

4.0 ROADMAP TOWARDS ZERO WASTE 2040

4.1 STRATEGIC FRAMEWORK

VISION

Kuala Lumpur Towards Zero Waste by 2040

MISSION

To reduce waste disposal to landfills by increasing resource recovery to support a sustainable circular economy for the benefit of the community, economy, and environment.

GOAL

To drive the transition towards a Zero Waste Kuala Lumpur by implementing effective policy interventions, governance, and enforcement, leveraging sustainable infrastructure and facilities, and strengthening collaboration between the public sector, industry, community, and educational institutions.

DEFINITION

The reduction of waste dispose to landfills through sustainable management, encompassing waste minimization at source, reuse, and recycling towards zero waste.

THEME

20:40 BY 2040
KUALA LUMPUR
TOWARDS ZERO WASTE

STRATEGIC PILLAR 1	STRATEGIC PILLAR 2	STRATEGIC PILLAR 3	STRATEGIC PILLAR 4
Policy & Governance	Enforcement	Infrastructure & Facilities	GICE Collaboration

STRATEGY & INITIATIVES

4.1.1 Vision

The vision **"Kuala Lumpur Towards Zero Waste by 2040"** is developed based on the urgent need to address the growing issue of solid waste in line with the city's increasing population and economic development. It reflects Kuala Lumpur's aspiration to be a pioneer in sustainability, in line with the Sustainable Development Goals (SDGs) such as SDG 11 (Sustainable Cities and Communities) and SDG 12 (Responsible Consumption and Production).

This vision is based on an analysis of current challenges and inspiration from international cities like Tokyo, Japan, which focus on waste reduction at the source, waste reuse, and recycling.

As the capital and a major city in Southeast Asia, Kuala Lumpur plays a key role as a model in zero waste practices. Its success can serve as a reference for other cities in Malaysia, while also attracting green investments and enhancing its reputation as an internationally recognized sustainable city. This effort also fosters social change, where the residents of Kuala Lumpur can become catalysts for awareness and a zero waste culture. This vision not only meets the current needs but also ensures a balance between economic development and environmental protection for future generations.

4.1.2 Mission

Landfills are often a source of environmental problems such as methane gas emissions, soil contamination, and groundwater pollution. Therefore, reducing landfill disposal through sustainable waste management strategies can alleviate pressure on existing landfills and reduce greenhouse gas (GHG) intensity.

Thus, the mission of this plan aligns with the Kuala Lumpur Low Carbon Society Blueprint 2030 (PIMRK KL 2030) and the Circular Economy Blueprint for Solid Waste in Malaysia (2025-2035), which emphasize sustainable waste management and the reduction of waste disposal to landfills. This effort will enhance resource recovery to support a sustainable circular economy, benefiting the community, economy, and environment.

This mission reflects DBKL's commitment to sustainable development by balancing social, economic, and ecological needs. However, its implementation requires collaboration from various stakeholders, including government agencies, the private sector or industry, communities, educational institutions, and all city residents to achieve Kuala Lumpur's goal towards zero waste by 2040.

4.1.3 Goal

The goal of this plan sets out the overarching vision of **"Towards Zero Waste Kuala Lumpur,"** which is Flagship Programme 8 of DBKL 15. The proposed implementation by DBKL focuses on advocacy, engagement, activation, and enforcement. Therefore, this plan concentrates on the implementation of a comprehensive strategy involving policies and governance, enforcement, infrastructure and facilities, as well as collaboration with multiple parties.

The transformation of Kuala Lumpur towards zero waste needs to be driven by:

1. Implementing a holistic, progressive, and inclusive policy
2. Promoting synergy between the public sector, industry, communities, and educational institutions
3. Leveraging smart technologies and sustainable solutions
4. Empowering communities through education and collective action

The goal of **"Towards Zero Waste"** is to make Kuala Lumpur a **Green and Sustainable City** that is resilient. This will not only improve the well-being of the community but also position Kuala Lumpur as a leader in sustainable urban development.

4.1.4 Definition of Zero Waste

Definition of Zero Waste Kuala Lumpur

WASTE REDUCTION TO LANDFILLS THROUGH SUSTAINABLE MANAGEMENT, WHICH INCLUDES THE PROCESSES OF SOURCE REDUCTION, REUSE, AND RECYCLING TOWARDS ZERO WASTE.

The definition of zero waste in Kuala Lumpur emphasizes diverting waste from landfills or incineration towards optimal waste management through source reduction, reuse, and recycling.

This definition reflects the aspiration to achieve zero waste by focusing on waste prevention, extending product lifespan through reuse, and recovering the value of waste through recycling. This approach is crucial to strike a balance between economic development, community welfare, and environmental sustainability.

4.2 THEME

20:40 by 2040
KUALA LUMPUR TOWARDS ZERO WASTE

LOGO

The zero waste logo symbolizes a hand gesture **combining "0" and "W,"** representing "Zero Waste." The **green color** and **leaves** symbolize a green and sustainable approach.

TEXT

The text on the logo indicates the target of 20:40, with Kuala Lumpur aiming for zero waste by 2040, **achieving a 20% reduction in organic waste and a 40% reduction in inorganic waste** sent to landfills.

- The theme "20:40 by 2040" is inspired by Kuala Lumpur's aspiration to divert 60% of waste from landfills by 2040, as outlined in the **Kuala Lumpur Structure Plan (PSKL) 2040.**

- The targets set in PSKL 2040 are:-
  a. 20% composting rate
  b. 40% recycling rate

- This reflects Kuala Lumpur's commitment to addressing the urban waste management challenges holistically since 2019.

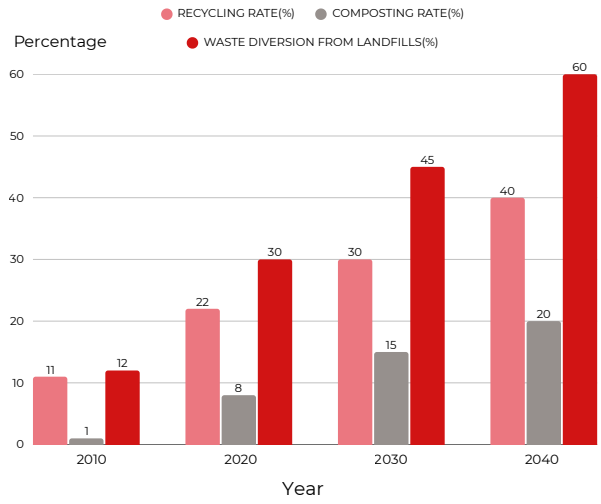


Figure 13: Recycling Rate, Composting Target, and Waste Diversion from Landfills
Source: Kuala Lumpur Structure Plan (PSKL) 2040

- However, this framework proposes **an enhanced 20:40 approach** in line with PSKL 2040, with improved targets:

1. **20% reduction in organic waste** sent to landfills by expanding composting initiatives and processing organic waste into new products.
2. **40% reduction in inorganic waste** focusing on reducing single-use materials, strengthening waste segregation at source (SAS), and promoting recycling.

4.2.1 Sustainable Management Approach

Conventional Approach:
Disposal as the Main Focus

The primary approach to waste management traditionally focuses on collecting and disposing of waste at landfills or through incineration. This approach often overlooks the potential for resource recovery and leads to negative environmental impacts such as air, water, and soil pollution.

New Approach:
Reduce, Reuse, and Recycle

In a paradigm shift, waste management now follows a waste management hierarchy that prioritizes:

- Prevention: Reducing waste generation at the source.
- Reuse: Maximizing the value of materials by reusing them.
- Recycling: Converting waste materials into new products.
- Energy Recovery: Benefiting from non-recyclable waste through processes like energy generation.
- Disposal: Only used as the last step.

This paradigm aligns with the concept of a circular economy and waste-to-X, where waste is seen as a resource with potential for reuse, not just as waste.

This shift also focuses on long-term sustainability, considering environmental, social, and good governance aspects in waste management.

This shift requires cooperation from various parties, including the government, industry, communities, and educational institutions, to ensure more sustainable waste management for the well-being of future generations.

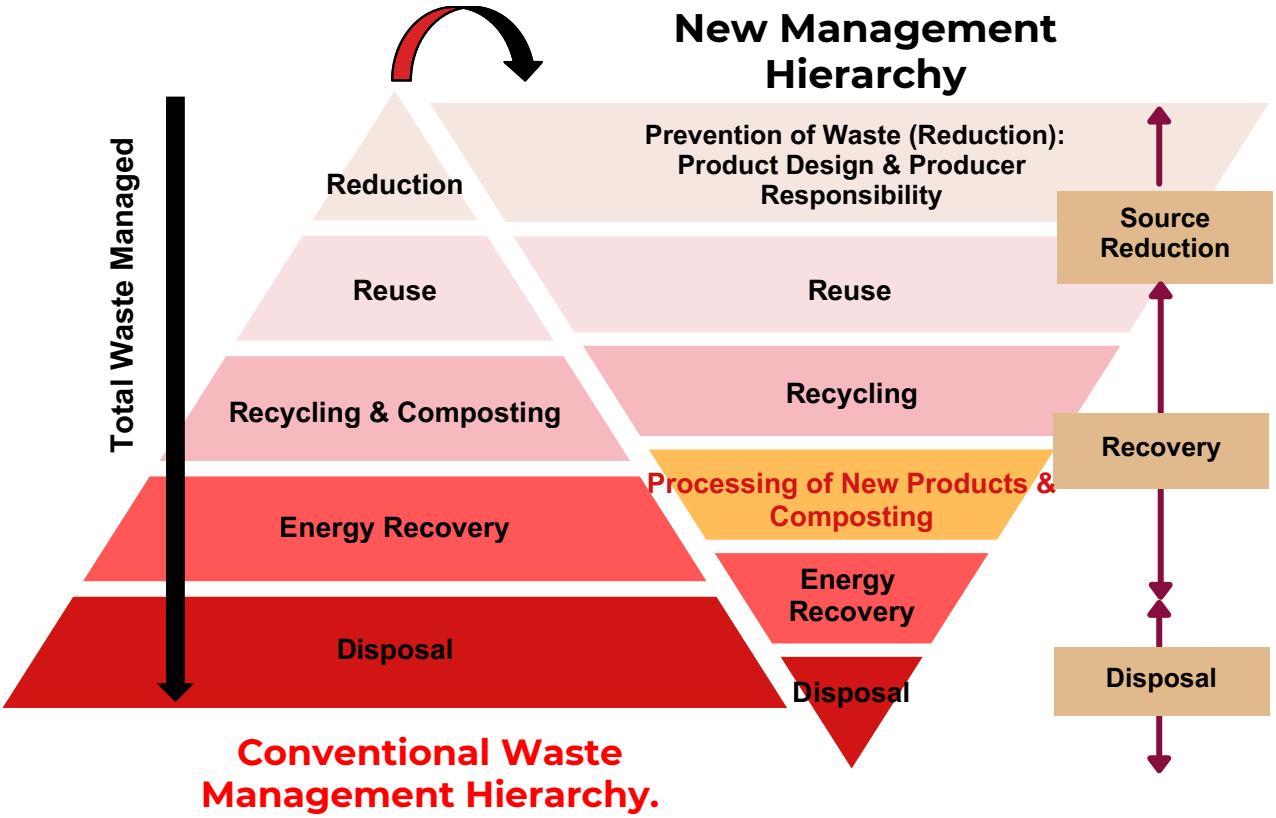


Figure 14: Paradigm Shift from Conventional Waste Management Hierarchy to New Waste Management Hierarchy.

- To achieve the "20:40 by 2040" zero waste goal, the top three sustainable management approaches in the hierarchy of waste reduction at source, reuse, and recycling must be implemented.

- This reflects a paradigm shift in solid waste management, transitioning from merely disposing of waste to a more sustainable, **resource-oriented approach.**

- Among the technologies gaining attention from both industry and the government is **Waste-to-Energy** technology. However, various **Waste-to-X** technologies can be considered as innovative ways to manage waste and promote more sustainable, technology-based interventions.

Figure 15: Definition of Sustainable Management Approach

SOURCE WASTE REDUCTION

Minimize waste generation at the early stages through various intervention methods.

REUSE

The process of reusing used materials, either for the same purpose or a different one, thereby extending the lifespan of the product.

RECYCLE

Inorganic waste

The process of recycling valuable waste materials to restore their original properties or transform them into new products.

Organic waste

The process of recycling organic materials into compost, soil rehabilitation products, and other similar uses.

Circular Economy

A circular economy is an economic system designed to minimize waste and use resources efficiently. By introducing holistic strategies such as refuse, rethink, reduce, reuse, repair, refurbish, remanufacture, repurpose, recycle, and recover, which have been developed from the previous 3R concept, it aims to reduce waste generation and optimize resource use. Furthermore, it is a response to challenges such as environmental pollution, increasing climate change, depletion of natural resources, and greenhouse gas emissions.

The agenda to accelerate the transition to a circular economy for sustainable solid waste management in the country is one of the goals under the 12th Malaysia Plan (RMKe-12) and the Circular Economy Blueprint for Solid Waste in Malaysia (2025-2035).

The country's commitment to achieving sustainable resource use is further strengthened through participation in SDG initiatives outlined by the United Nations and the Paris Agreement. Malaysia aims to achieve a circular economy transformation by 2050 while simultaneously promoting economic growth, social well-being, and environmental sustainability.

Figure 16: Circular Economy Concept

Waste-to-X

Waste-to-X (WtX) refers to various technologies and processes that can transform waste materials into valuable products such as energy, fuel, chemicals, or other useful resources. The letter "X" in Waste-to-X represents the different outcomes that can be achieved, depending on the technology and waste materials used. Some of the Waste-to-X processes include:

1. **Waste-to-Energy (WtE) –** Converting waste into electricity or heat through incineration, gasification, or anaerobic digestion.
2. **Waste-to-Fuel (WtF) –** Producing biofuels (e.g., biodiesel, bioethanol, synthetic fuel) from organic waste, plastics, or biomass.
3. **Waste-to-Gas (WtG) –** Generating biogas, syngas, or hydrogen from waste via anaerobic digestion or gasification.
4. **Waste-to-Chemicals (WtC) –** Converting waste into valuable chemicals and raw materials for industrial use.
5. **Waste-to-Value (WtV) –** A broad category that includes any process that converts waste into useful materials such as plastics, textiles, or construction materials.

4.3 STRATEGIC PILLARS

- This framework proposes four main Strategic Pillars that can drive various intervention projects and initiatives to achieve zero waste by 2040
- The establishment of these strategies is based on a detailed analysis of the current situation, as well as the issues and challenges faced by all stakeholders, particularly the local authorities.

POLICY & GOVERNANCE

STRATEGIC PILLAR 1

Policy & Governance: Initiatives involving policies related to compliance, monitoring, and regulatory mechanisms.

ENFORCEMENT

STRATEGIC PILLAR 2

Enforcement: Ensuring compliance through effective supervision, fair actions, and incentives that encourage behavioral change.

INFRASTRUCTURE & FACILITIES

STRATEGIC PILLAR 3

Infrastructure and Facilities: Elements related to the development of physical infrastructure, systems, or technological requirements.

GICE COLLABORATION

STRATEGIC PILLAR 4

Collaboration - Empowering synergy between the government, industry, community, and educational institutions.

- Pillar 1 aims to strengthen policies and governance. This can improve existing policy planning and strategies or develop new holistic policies that help the implementation of intervention programs more effectively by all stakeholders. This pillar is crucial to achieving the vision because it sets goals, targets, and specific mechanisms to assess progress and the success of the plan.

- Pillar 2 aims to enhance the accountability of various authorities in ensuring compliance with laws and guidelines on waste management, ensuring that these are applied across all layers of Kuala Lumpur's society.

- Pillar 3 focuses on the continuous improvement of waste management infrastructure and facilities through various technological interventions, facilities, and logistics to enable better services to be delivered to the targeted stakeholders.

- Pillar 4 emphasizes synergy and strategic collaboration between government agencies, industry, communities, and educational institutions (G-I-C-E) in driving activities and innovation in waste reduction, management, and processing.

4.3.1 Implementation Strategy

The framework also outlines the Implementation Strategy through three project milestones: Quick Win Projects, Support Projects, and High-Impact Projects.

- Quick Win Projects (2025-2030) involve swift actions to deliver immediate results and benefits.
- Support Projects (2030-2035) include collaborative initiatives with various stakeholders.
- High-Impact Projects (2035-2040) are large-scale efforts that require investments in infrastructure, technology, and facilities.

Quick Win Projects can be internal, where local authorities can implement simple, controlled, and flexible interventions across all facilities under KLCH's supervision. These interventions can begin as early as 2025 to create initial acceptance among various stakeholders in the zero-waste initiative in Kuala Lumpur, while also enhancing KLCH's credibility as a serious entity in waste management.

Support Projects involve various stakeholders, including government agencies, the private sector and industries, NGOs, communities, and educational institutions, with a focus on gradual waste reduction through a circular-economy approach. These projects may range from advocacy to supporting different zero-waste activities.

High-Impact Projects will have significant long-term effects on society, the economy, and the environment. This project milestone will involve the central government and various agencies in planning and executing large-scale projects as needed in Kuala Lumpur. These projects must be effective, sustainable, and have a substantial impact on achieving zero waste in Kuala Lumpur by 2040.

The suggested timeline ensures that each project milestone is successfully achieved by 2040. For example, the planning for high-impact projects doesn't necessarily have to start only in 2035, as outlined. It could start as early as 2025, complete construction by 2035, and be fully operational by 2040.

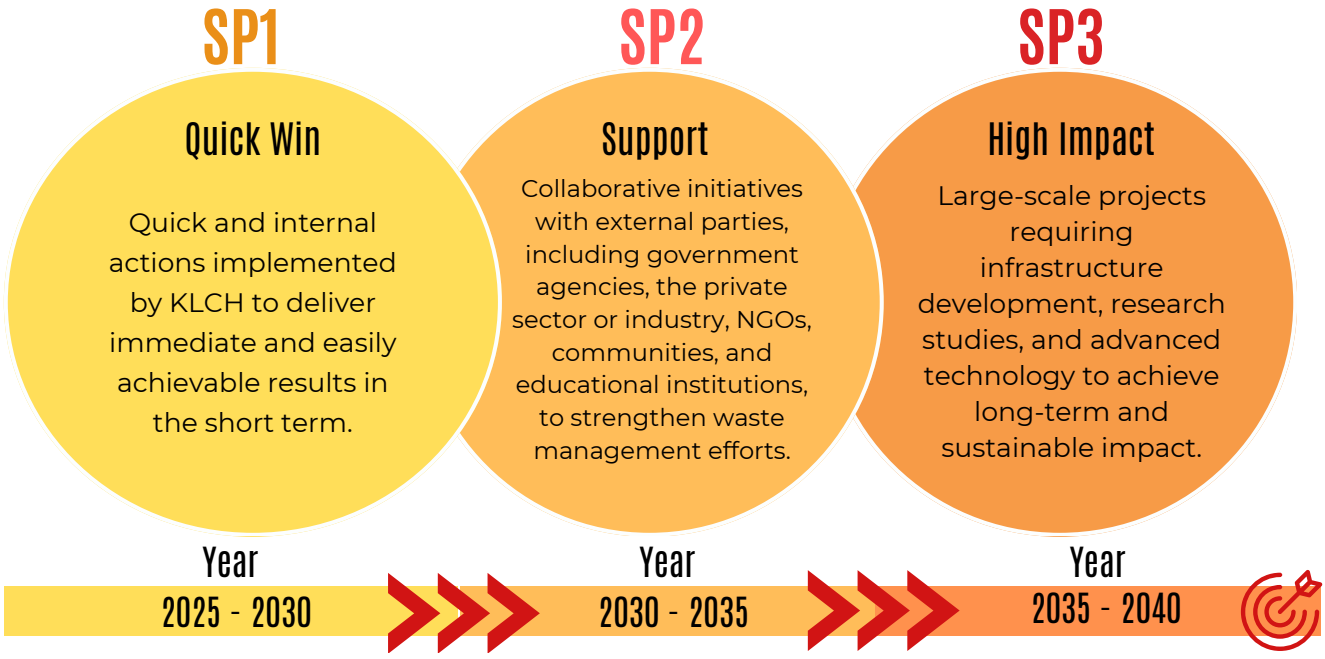


Figure 17: Recommended Implementation Strategy

Quick Win: Transition Phase

Definition: A swift and internal action implemented by DBKL to deliver immediate and easily achievable results. Acts as a pioneer to raise awareness, establish a foundation, and build momentum towards the goal of zero waste.

Characteristics:

- Implementation within a short-term period (6-12 months up to 5 years)
- Focus on internal operational actions
- Utilizes existing resources with minimal planning for immediate and cost-effective changes
- Delivers significant impact to build public confidence

Example Elements:

- Conducting internal waste management efficiency audits to monitor waste flow.
- Launching internal waste separation training campaigns for DBKL staff and waste management contractors.
- Internal awareness campaigns through visual signage in the city.

Support: Catalyst Collaboration Phase

Definition: A collaborative approach involving cooperation among various stakeholders such as the government, community, industry, and universities to enhance capacity and support waste management efforts. It provides continuity to existing programs, bridging Quick Win and High Impact initiatives, with a focus on medium-impact projects over a 1-5 year period.

Characteristics:

- Implementation within a medium-term period (1-5 years).
- Involves strategic collaboration between DBKL and external parties.
- Leverages technological innovation or expertise gained through partnerships.
- Creates a broader impact on the community and the waste management system.

Example Elements:

- Collaboration with universities for research and innovation in composting technology.
- Recycling material collection programs with local communities and NGOs.
- Partnership with the private sector to launch a digital waste management platform.

High Impact: Structural Transformation Phase

Definition: Large-scale projects involving major infrastructure development, advanced technology, and comprehensive research studies to achieve long-term sustainable impact. This approach drives deep systemic changes to achieve zero waste targets.

Characteristics:

- Implementation over the long term (3-10 years or more).
- Requires high financial investment and resources.
- Delivers comprehensive and sustainable impact on the economy, community, and environment.

Example Projects:

- Construction of an Integrated Waste Treatment Facility (IWTF).
- Development of high-tech waste processing centers, such as waste-to-energy plants.
- Implementation of a digital integrated waste data system utilizing AI for real-time monitoring.
- Comprehensive study on urban waste flow for future circular economy planning.

4.3.2 Pillar Mapping

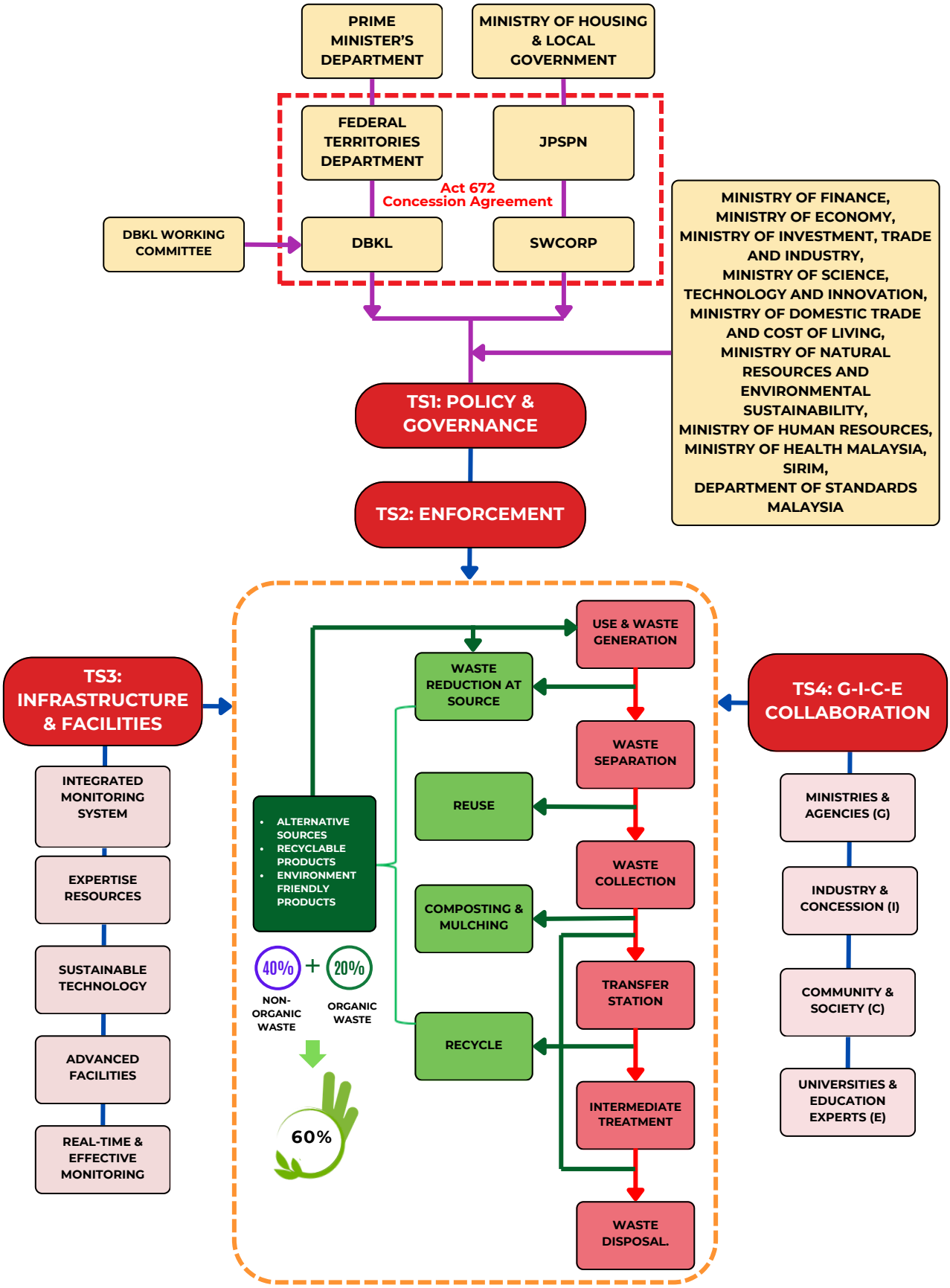


Figure 18: Mapping of Strategic Pillars in the Implementation Plan for Solid Waste Management and Public Cleaning in Kuala Lumpur.

This plan establishes four (4) main strategic pillars that serve as the foundation for more sustainable and efficient waste management.

Pillar 1 is Policy and Governance, a crucial pillar in achieving the zero waste agenda for Kuala Lumpur. It emphasises the coordination and strengthening of existing policies and administrative structures. Therefore, this pillar involves various key government agencies, including the Prime Minister's Department (JPM), the Ministry of Housing and Local Government (KPKT), and the Federal Territories Department. The roles of the National Solid Waste Management Department (JPSPN), Kuala Lumpur City Hall (KLCH), and SWCorp are further strengthened through Act 672 and the Concession Agreement to ensure more orderly policy implementation.

Pillar 2 is Enforcement that focuses on compliance with laws, regulations related to waste management, and oversight. Effective, comprehensive, and consistent enforcement and regulation, including regular inspections, imposition of fines, and monitoring of public cleaning services, are essential to ensure that all parties involved adhere to the established standards. This approach is important to ensure the effective implementation of policies in maintaining the cleanliness of the city.

Pillar 3 is Infrastructure and Facilities that focuses on the development of infrastructure and the use of relevant technologies for waste management. Key components include an integrated monitoring system using smart technology for real-time operational monitoring, waste treatment and transfer facilities, and various advanced, sustainable technologies. The implementation of this infrastructure will enhance the transparency and effectiveness of waste management operations, while supporting the goal of reducing waste at the source.

Meanwhile, Pillar 4 emphasizes cooperation and synergy between G-I-C-E (Government, Industry, Community, Educational Institutions). The government and agencies play a role in providing policies and allocations, while the industry and concessionaires contribute in terms of logistics and technology. Community involvement is also crucial in promoting waste separation and recycling practices at the grassroots level, while educational institutions and experts can contribute to research and the development of new interventions and technologies.

This plan also maps out the complete process of solid waste management, from waste reduction at the source to final disposal. It includes waste separation, waste collection, transfer to treatment stations, as well as the treatment process to reduce environmental impacts before final disposal takes place.

With a target waste reduction of 20:40, this plan features a comprehensive and collaborative approach to ensure that Kuala Lumpur achieves efficient and environmentally friendly solid waste management. The diversion of 20% organic waste and 40% inorganic waste plays an essential role in reducing the burden on landfills by 2040.

Organic waste can be utilized through composting and mulching to produce natural fertilizers, supporting sustainable agriculture, and minimizing methane emissions that harm the environment. Non-organic waste, such as plastics, can be recycled or redesigned for new uses, extending the lifespan of these materials within the economy.

The adopted circular economy approach can help optimize resource use, reduce the volume of waste sent to landfills, and support sustainable development.

4.4 ZERO WASTE TARGET

The 12th Malaysia Plan (RMKe-12) aims for a national recycling rate (KKSK) of 40% by 2025. The national recycling rate takes into account **five types of waste**: plastic, paper, metal, glass, and others (fabric and rubber).

This is because not all of these wastes can be recycled due to factors such as:

- Dirty waste and high moisture content
- Unaccounted waste, buried, or burned waste
- The existing technology in Malaysia is limited to recycling only specific types of waste

However, KLCH plans to target six types of waste: food waste, garden waste, paper, plastic, textiles, and wood. Waste interventions such as diapers, metals, and others (household hazardous waste, rubber, Tetrapak, glass, mixed waste, etc.) are part of the intervention plans and will require time to involve various stakeholders.

The targeted waste is proposed to be classified as organic and inorganic waste to facilitate the development of the next action plan. The proposed classification is as follows:

- **Organic waste** includes **food waste and garden waste.**
- **Inorganic waste** includes waste other than food and garden waste, with a composition of 3% and above, such as **paper, plastic, textiles, and wood.**

The proposed zero waste target for Kuala Lumpur by 2040 is shown in Figure 19. The reduction of organic waste is targeted at 20%, and inorganic waste at 40% through the 20:40 zero waste intervention by 2040.

According to the "business as usual" simulation, the waste threat by 2040 is projected to be 1,409,265 tons per year. Through the zero waste intervention, the total waste is expected to be reduced to 563,706 tons.

Figure 19: Kuala Lumpur's Zero Waste Target 2040

4.4.1 Proposed Interventions

Based on a sustainable management approach for waste reduction at the source, reuse, and recycling, various technologies and innovative approaches can be implemented for solid waste management in Kuala Lumpur. Several examples of interventions using technology and innovative approaches have been outlined below according to the type of waste.

1 FOOD WASTE

1. Separation at Source
2. In-Vessel Composting
3. Use of Worms (Vermicomposting)
4. Open-Air Composting
5. Anaerobic Digestion - Biogas
6. Composting - Black Soldier Fly Larvae
7. Composting - Effective Microorganisms (EM)
8. Bio-Waste Drying

2 GARDEN & WOOD WASTE

1. Separation at Source
2. In-Vessel Composting
3. Use of Worms (Vermicomposting)
4. Open-Air Composting
5. Anaerobic Digestion - Biogas
6. Composting - Black Soldier Fly Larvae
7. Composting - Effective Microorganisms (EM)
8. Reuse as Mulch

3 TEXTILE WASTE

1. Waste Separation at Source through special bins in collaboration with social enterprises
2. Use/Redistribution to those in need
3. Driving the circular economy by producing new products at Recycling Centers with single mothers or B40 community members

4 PLASTIC WASTE

1. Separation at Source through SAS or MRF at KLTS
2. Collection/Buyback at Recycling Centers
3. Driving EPR Cooperation such as Nestle and Coca-Cola for Collection and Reuse
4. RDF (Refuse Derived Fuel)
5. Pyrolysis
6. Depolymerization
7. Waste-to-X

5 PAPER WASTE

1. Separation at Source through SAS or MRF at KLTS
2. Collection/Buyback at Recycling Centers
3. Driving EPR Cooperation such as Nestlé for Collection and Reuse
4. RDF (Refuse Derived Fuel)
5. Waste-to-X

6 METAL WASTE

1. Waste Separation at Source
2. Collection/Buyback at Recycling Centers
3. Driving EPR Cooperation, such as construction companies for collection and reuse

7 DIAPER WASTE

1. Waste Separation at Source and Collection through Special Contractors
2. Controlled Incineration
3. Special Processes

INTERVENTION PRACTICES IN KUALA LUMPUR.

1 Community 1 Recycling (1C1R)

DBKL, through JKAS, has implemented the 1 Community 1 Recycling (1C1R) program and provided 1C1R kiosks in several residential areas to encourage recycling and the reuse of waste by the community. This program adopts the concept of the Circular Economy as the basis for its implementation. Recyclable waste such as paper, plastic, aluminium cans, and used cooking oil is separated and collected for exchange with essential food items and PA/PPR rental payments (KLCH, 2023).

This program also indirectly encourages urban residents to engage in waste separation at source (SAS) for recyclable waste. This development can be seen in the increase in the amount of waste successfully collected by type from 2022 to 2024 in Kuala Lumpur. (SWCorp, 2024).

Collection of Recyclable Items (Tonnes) through 1 Community 1 Recycling (1C1R) Program and 1C1R Kiosks

Program	 Paper	 Plastic	 Aluminum Can	 Used Cooking Oil
Program 1 Komuniti 1 Kitar Semula (Tonne)	14.251	2.011	0.041	0.003
1C1R Kiosk (Tonnes)	2.693	0.838	0.012	1.037

Figure 20: Recycling Collection Data from the 1 Community 1 Recycling Program and Kiosks for the Year 2024
Source: JKAS, DBKL, 2024.

Waste Separation at Source (SAS)

Collection of Various Wastes (tonnes) through Waste Separation at Source in the Federal Territory of Kuala Lumpur from 2022 to 2024

Year	 Paper	 Plastic	 Metal	 Aluminium	 Glass	 Electronic Waste	 Others
2022	580.33	210.95	41.05	3.43	321.28	18.05	21.87
2023	661.98	203.63	52.03	3.72	385.23	14.19	6.71
2024*	547.24	135.55	41.97	3.25	358.18	6.48	4.47

*Data for the year 2024 is up to November 2024.

Figure 21: Collection Data of Various Wastes through Waste Separation at Source in the Federal Territory of Kuala Lumpur
Source: SWCorp, 2024.

INTERVENTION PRACTICES IN KUALA LUMPUR

Generation & Processing of Landscape Waste into Compost and Mulch

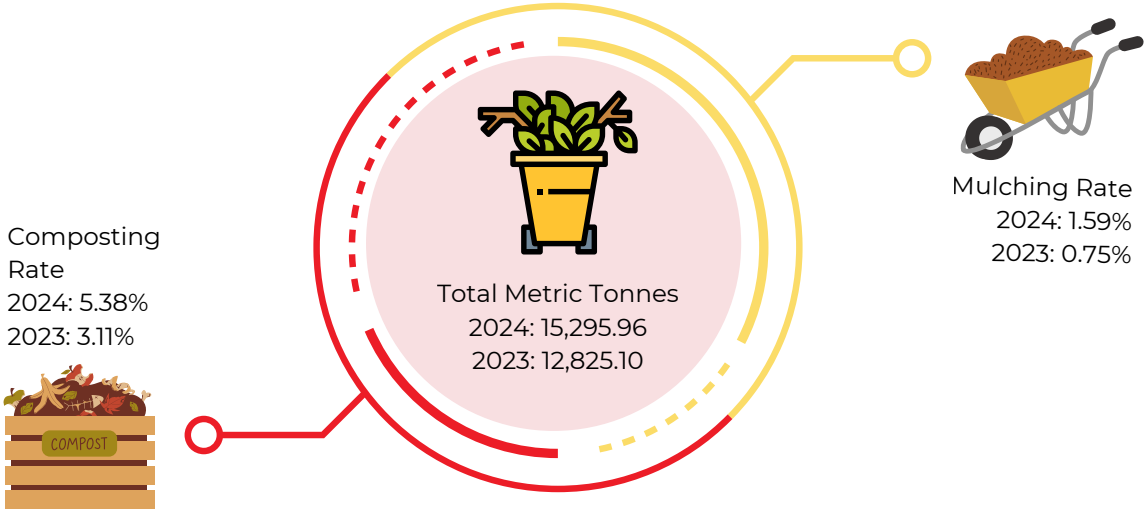


Figure 22: Generation of Landscape Waste into Compost and Mulch (%)
Source: JPLR; DBKL (2024)

The Landscape and Recreation Development Department (JPLR), DBKL, in collaboration with MIG Green Resources Sdn Bhd, has begun taking steps to collect and compost garden and landscape waste at a special center known as the Garden Waste and Compost Processing Center. This is one of the good initiatives to create a circular economy market such as organic fertilizers, black compost, and others.

It was found that the total metric tons of landscape waste has increased every year, with an additional nearly 3,000 tons from 2023 to 2024. In 2024, the composting rate reached 5.38%, and the mulching rate was 1.59% of the total 15,295.96 tons of waste collected.

Meanwhile, in 2023, the composting and mulching rates increased from 3.11% and 0.75%, respectively, with a total generation of 12,825.10 tons of waste.

This intervention can be further expanded as the rates of compost and mulching production are still at a low level compared to the total landscape waste collected.

4.4.2 Potential Construction Waste

Figure 23: Data on the Number of Development Projects Generating Construction Solid Waste
Source: SWCorp Annual Report, 2021.

Construction and Demolition Waste is a regulated solid waste under the Solid Waste Management and Public Cleansing Act 2007 (Act 672). Enforcement since March 1, 2020, regarding construction solid waste includes:

i) Solid Waste Management and Public Cleansing (Scheme for Construction Solid Waste) Regulations 2018.
ii) Solid Waste Management and Public Cleansing (Licensing) (Waste Collection Service Providers for Construction Solid Waste) Regulations 2018.

These regulations require every waste generator to separate recyclable and non-recyclable solid waste and appoint a licensed waste collection service provider to collect the waste and ensure that the waste is sent to designated facilities.

In 2021, SWCorp reported that the Federal Territory of Kuala Lumpur recorded the highest construction solid waste disposal, totaling 117,399.60 tonnes. This total resulted from 266 development projects, which included 159 residential projects and 107 non-residential projects (CIDB, 2021). Starting January 1, 2023, this construction waste must be disposed of at the Lengai Kuang Landfill (Rawang), Lengai Dengkil Landfill (Sepang), and Sungai Sabai Landfill, Kalumpang (Hulu Selangor).

However, in 2022, 29 out of 42 reported 'hotspots' of illegal waste disposal were hotspots for construction waste disposal, with a total of 326 tonnes of construction waste disposed of, compared to a total of 344.3 tonnes of waste found (SWCorp, 2023). Examples of construction waste include ferrous or non-ferrous metals, soil, stone, sand, cement, bricks, concrete, asphalt and bitumen materials, treated or untreated wood, plaster, plastic, paper, as well as hazardous materials such as paints and lacquers.

The composition of construction waste in Malaysia reported by SWCorp (2021) includes soil (66%), mixed waste (16%), iron (7%), concrete (5%), wood (4%), bricks (1%), and paper (1%).

According to this classification, most of the waste has potential for reuse as building materials, such as soil, bricks, and concrete, without being directly disposed of in landfills. Wood can be recycled into engineered wood products, such as furniture. Metals, including steel, copper, and brass, are valuable commodities for recycling.

The increase in construction activity is expected to continue in line with the growing population and modernization of the Kuala Lumpur city. Therefore, this waste has the potential to be targeted for Kuala Lumpur's zero waste goal, simultaneously eliminating illegal waste disposal hotspots.

4.4.3 Potential of Electronic Waste

In Malaysia, electronic waste or e-waste is categorized as scheduled waste with the code SW110 under Schedule 1, the Environmental Quality (Scheduled Wastes) Regulations 2005, Environmental Quality Act 1974, enforced by the Department of Environment (DOE).

E-waste consists of damaged, non-functional, or outdated electrical and electronic items such as mobile phones, computers, televisions, washing machines, refrigerators, and air conditioners. According to The Global E-waste Monitor (2020), Malaysia generates 11.1 kg/capita of e-waste per year and is projected to generate 24,504,000 units of e-waste by 2025.

Under the supervision of DOE Kuala Lumpur, there are five (5) Semi-Off-Site Electrical and Electronic Waste (e-Waste) Recovery Facilities and Off-Site Storage Facilities for the transportation of such waste.

These facilities are also promoted through the MyEwaste application, which provides easy access for users or companies to obtain information and locate registered e-waste collection centers.

In addition to collection centers, the government has also introduced the last Saturday of every month as E-waste Collection Day.

Data on e-waste collection in 2023 shows that Kuala Lumpur generated nearly 8 tons of e-waste, with 1 ton of that amount collected through 28 community programs held throughout Kuala Lumpur (JASWPKL, 2023).

JAS actively applies the concept of Extended Producer's Responsibility (EPR) and Shared Responsibility to all stakeholders involved, including consumers as e-waste generators, registered collection centers with JAS, producers, importers, and e-waste recovery facilities (recycling premises) licensed by JAS.

Therefore, strategic collaboration with JAS can be implemented to make e-waste one of the zero waste targets. Additionally, strategies such as the use of smart apps, EPR activities, community programs, and E-waste Collection Day can be practiced as interventions for various other wastes in Kuala Lumpur.

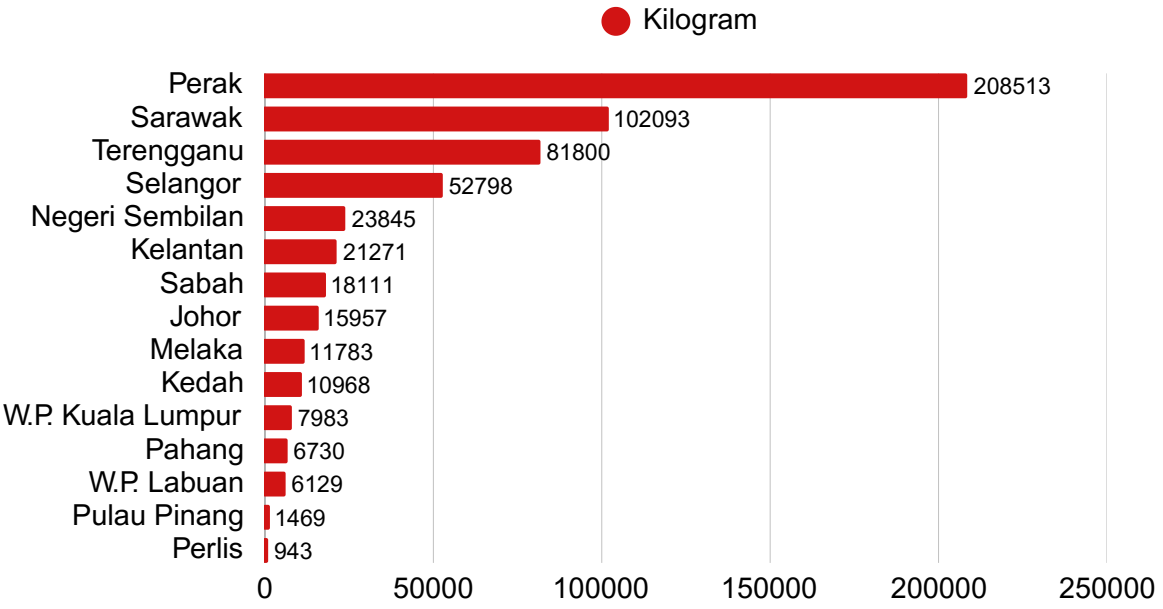


Figure 24: Data on E-Waste Collection by State in 2023
Source: JAS Annual Report 2023, (JAS, 2023)

4.5 TIMELINE

Kuala Lumpur Towards Zero Waste

2024

- Preparation of the Framework for the Kuala Lumpur ROADMAP Towards Zero Waste 2040
- Data Collection
- Engagement Sessions with Stakeholders

2025

- Launch of Kuala Lumpur Towards Zero Waste 2040
- Preparation of a comprehensive Action Plan
- Strengthening Policy & Governance
- Driving Quick Win Projects
- Campaign to eliminate single-use plastics

2030

- Development of the Recycling Park (Eco Recycling Park)
- Initiation of High-Impact Projects such as the establishment of Material Recovery Facilities (MRF)
- Completion of C&D Waste Processing Facility
- Expected reduction of organic waste by 5% and inorganic waste by 15%
- 50% reduction in plastic waste

2035

- The reduction of organic waste is expected to be 10%, and inorganic waste by 30%
- Diversion of C&D waste

2040

20:40 by 2040
KUALA LUMPUR TOWARDS ZERO WASTE

The reduction or diversion of 60% of waste from landfills:

- **20% organic waste**
- **40% inorganic waste**

Figure 23: Timeline of Kuala Lumpur Towards Zero Waste 2040

4.6 RECOMMENDATIONS

This study **RECOMMENDS** the preparation of a comprehensive document for the **ACTION PLAN TOWARDS ZERO WASTE KUALA LUMPUR 2040**, which includes implementation strategies according to:

1

- The theme and target of **20:40 by 2040** focus on the reduction or diversion of 20% organic waste and 40% inorganic waste from landfills.
- The proposed logo can be improved, but it should still follow the zero-waste concept.

20:40 by 2040
KUALA LUMPUR TOWARDS ZERO WASTE

2

- Interventions and initiatives are recommended to follow the Strategic Pillars:

Strategic Pillar 1
POLICY & GOVERNANCE

Strategic Pillar 2
ENFORCEMENT

Strategic Pillar 3
INFRASTRUCTURE & FACILITIES

Strategic Pillar 4
GOVERNMENT-INDUSTRY-COMMUNITY-EDUCATIONAL INSTITUTION (GICE) COLLABORATION

3

- Project reach can be achieved through:

QUICK-WIN PROJECT
(2025 - 2030)
Quick and Immediate Results

SUPPORT PROJECT
(2030 - 2035)
Collaborative initiatives with various stakeholders

HIGH IMPACT PROJECTS
(2035 - 2040)
Large-scale efforts that require investment in infrastructure, technology, and various resources.

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IMAGE CREDITS

Page	Photos	Photographer Name
Front & Back Pages	Kuala Lumpur's City View	Wengang Zhai
5	Petronas Twin Towers	Irfan Syahmi
16	Petronas Twin Towers	Polina Kuzovkova
18	KL Eco Rimba Park	ArtRomanov/Shuterstock
21	Taman Tasik Titiwangsa	TripAdvisor
15 & 16	Awesome view of the KLCC Park and Petronas Twin Towers	efired/stock.adobe.com
19 & 20	Kuala Lumpur, Malaysia. Skyline	Luciano Mortula LGM/stock.adobe.com

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