Ministry of Environment,
Climate Change and Technology of the Maldives

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Consultancy Assignement for the Revision of National Waste Management Policy and Formulation of a National Waste Management Strategy (MV-MEE-160547-CS-CQS)

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National Waste & Resource Management Policy and Strategy

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1. EXECUTIVE SUMMARY

The new National Waste Management Policy and Strategy (NWMPS) 2023-2027 is a policy instrument for the sustainable solid waste management in the Maldives. It has the scope to protect nature, public health and the well-being of the citizens. It intends to transform the production pattern in an ecological way that will change the consumption pattern and effectively utilize waste as resource.

Sustainable and integrated waste management is the core of the new Policy, based on the waste hierarchy principle. Priority is given to avoidance of waste generation and reuse as the optimum option, followed by recycling, energy recovery, and as a last and least desired option by landfilling, in suitable and engineered sites. Realistic but ambitious targets are set that have to be reached by the competent actors.

The growing amount of generated waste results in significant environmental impacts, greenhouse gas emissions, soil and sea pollution and, most important, to a loss of resources. The National Waste Management Policy and Strategy, in combination with the new Waste Management Act, aims to change this current model to a circular one. Through the implementation of a range of measures, the five overarching principles (policies) are embedded in the National Waste Management Policy and Strategy:

1. Waste hierarchy principle: a priority order shall be applied in waste reduction (prevention) and reuse, followed by recycling, energy recovery and least preferred option landfill disposal.
2. Polluter's Pay Principle: the costs of waste management must be borne by the waste producer or by the legal entity managing waste on behalf of others.
3. Extended producer responsibility: the producer or importer of a product bears the responsibility to manage their product after it is no longer usable and has been discarded.
4. Full Cost Recovery: tariffs for a given service shall aim to recover the operating and maintenance cost, including environmental and resource costs, as well as the capital cost as much as possible. The tariff structure shall take affordability of the service and any other subsidies into account.
5. Proximity and Decentralisation: waste management shall be undertaken as close to the source of generation as possible, taking into account geographical circumstances.

The NWMP covers both municipal and special type waste. It encompasses 13 Goals as follows:

- Goal 1: Develop and enforce secondary regulations, standards, guidelines and plans
- Goal 2: Strengthen the decentralized waste management model by completing the infrastructure on island and regional level
- Goal 3: Ensure effective collection and local treatment of organic waste
- Goal 4: Close and rehabilitate at least 50% of island dumpsites
- Goal 5: Implement the Single Use plastics phase-out plan and further reduce plastic waste
- Goal 6: Provide for Beaches and Public Areas cleaning
- Goal 7: Development of a National Data and Information Registry

- Goal 8: Design and implement an effective model for Extended Producers Responsibility and Take-Back schemes
- Goal 9: Engage the private sector in waste management activities and establish procedures for more efficient involvement
- Goal 10: Increase public awareness on waste management, and enhance human resources through training and capacity building
- Goal 11: Handle hazardous and other special waste in a safe manner
- Goal 12: Coordinate with tourism sector to adopt sustainable waste practices
- Goal 13: Promoting Waste Prevention and Transitioning to Circular Economy

2. STRUCTURE OF THE NATIONAL POLICY AND STRATEGY

The Structure of the National Policy and Strategy is divided to eight chapters:

Chapter 1 Executive Summary

Chapter 2 Structure of the National Policy and Strategy

Chapter 3 Introduction: this chapter summarises the scope, vision and principles embedded in the National Policy. The main international policies in waste are presented. Last, an overview of the challenges faced in waste management in the Maldives is given.

Chapter 4 Current Waste Management Situation and Waste Generation: Chapter 4 provides the current baseline in the Maldives, in terms of both waste generated, as well as the existing management method and available infrastructure. This is made for both municipal waste, as well as for special waste as per Annex 2 of the Waste Regulation.

Chapter 5 Policy and Legal Framework: Chapter 5 first presents the existing Strategic Action Plan, of which Waste & Resource Management is an important Sub-Sector. The chapter also assesses the new Waste Management Act, the SUP Ban Decree and the Waste Management Regulation (2013).

Chapter 6 Proposed Waste Management System: this chapter presents where we want to go in the future in waste management, and what we want to achieve. It encompasses significant milestones to realise, such as: Cease of open burning and closure of dumpsites, Improvement of island segregated collection and treatment system, Waste prevention (reduction) and reuse, Establishment of an EPR system, Facilitate a regular and effective Capacity Building mechanism, Establish a sound working environment for special and hazardous waste treatment, setting up a National Data and Information Registry, Engagement of private sector in waste management and Transition to Circular Economy.

Chapter 7 Measures to Implement the Goals: the 13 Goals are accompanied by 64 Measures, detailed here together with the responsible body, the indicator and the timeline.

Chapter 8 Prospects and Development Opportunities from the Policy Implementation: The new Policy for waste and resources management contributes to “Blue economy”, and in this frame, prospects and development opportunities arise from the implementation. These are outlined in chapter 6.

Chapter 9 Monitoring and Assessment of NWMPS Implementation: Continuous monitoring and assessment of the Policy is a crucial factor for the implementation and revision of targets/ actions where necessary and this last chapter details this process.

3. INTRODUCTION

3.1. SCOPE, VISION AND GOALS

3.1.1. Scope

Waste has evolved as a global environmental problem, posing a pollution risk to the unique terrestrial and marine environment of Maldives. Waste generated in our communities, leaks into the marine environment and endangers the marine habitat life, and especially the precious coral reefs. At the same time, it represents a huge loss of precious resources affecting the wider economy. Understanding the complexity of the problem, the Ministry of Environment, Climate Change and Technology (at that time Ministry of Environment) has published in 2008 the first National Policy, followed by an update in 2015. The Policies were accompanied by a number of laws and regulations.

The Government of Maldives has compiled the Strategic Action Plan (SAP) 2019 – 2023 with a view to both foster national development and align to the Sustainable Development Goals (SDGs) set by the United Nations General Assembly. The SAP is divided to five priority areas aiming to make the country a social, education, environment and climate resilient exemplary. Sub-sector "4.5 **Waste as a resource**" entails 4 Policies, where each one is divided to strategies and actions.

Every day we consume common plastic products (straws, cups, food trays, etc.) for once rather than repeatedly which are afterwards immediately discarded. Maldives is committed and already started in 2022 to phase out these Single-Use-Plastics, which are replaced with more eco-friendly alternatives, made of natural compounds. Especially for plastic bags, a levy is posed to a single item since 2022 so as to favour multi-use carriers.

The major waste management infrastructure project (planned and currently under construction) is the Waste-to-Energy plant in Thilafushi, that will comply with the strictest technical and environmental standards when it becomes operational in 2025. The WtE plant will serve the Greater Male Area, the entire WM Zone 3 and Zones 4 and 5. Two similar small-scale plants will be constructed at Vaadhoo, Raa Atoll (refurbishment of the current non-operating facility) which will serve WM Zones 1 and 2 and at Hithadhoo, Addu Atoll, to serve the South Region (WM Zones 6 and 7).

The Ministry of Environment, Climate Change and Technology has worked intensively to modernise the legal framework on waste by proposing a new Waste Management Act. The Act has been approved and published in the Governmental Gazette in the end of 2022.

However, and despite the huge efforts, it is recognized that progress has been slow with results not as desired, whereas waste management is far from sustainable. A primary target to achieve 25% reuse and recycling was not met, due to various reasons such as non-compulsory measures and absence of guidance. Individuals and companies have not been sufficiently encouraged to handle their own waste in a sustainable manner.

Moreover, the waste sector contributes to global warming effect. The latest national inventory indicates that emissions from the waste sector amounts for 5.9 % of the total Greenhouse Gas emissions in Maldives.

A new policy framework is required to engage all responsible actors, including citizens, and accelerate the shift from a "throw-away" society (cradle to grave or linear model) to a circular model. The National Waste Management Policy and Strategy (NWMPS) 2023-2027 is a policy instrument for the sustainable solid waste management and with the scope to protect nature, public health and the well-being of the citizens. It intends to transform the production pattern in an ecological way that will change the consumption pattern and effectively utilize waste as resource.

Sustainable and integrated waste management is the core of the new Policy, based on the waste hierarchy principle. Priority is given to avoidance of waste generation and reuse as the optimum option, followed by recycling, energy recovery, and as a last and least desired option by landfilling, in suitable and engineered sites. For the first time, **realistic** but **ambitious targets** are set that have to be reached by the competent actors. The new Policy will investigate the approach to complete the necessary infrastructure and achieve the goals.

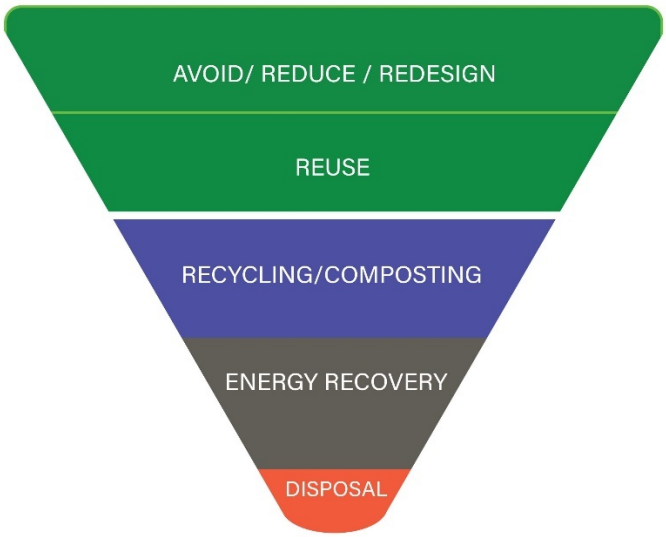


Figure 1: Waste hierarchy graph

3.1.2. Vision

The proposed Vision Statement of the NWMPS is to preserve Maldivian biodiversity and protect the nation's unique nature by promoting source segragation and waste minimisation at a national level and by shifting to more sustainable business model and lifestyle approaches that will view Waste as Resource.

3.1.3. Waste Management Overarching Policies

Five overarching policies (principles) are embedded in the National Waste Management Policy and Strategy:

1. Waste hierarchy principle: a priority order shall be applied in waste reduction (prevention) and reuse, followed by recycling, energy recovery and least preferred option landfill disposal.

2. Polluter's Pay Principle: the costs of waste management must be borne by the waste producer or by the legal entity managing waste on behalf of others.
3. Extended producer responsibility: the producer or importer of a product bears the responsibility to manage their product after it is no longer usable and has been discarded.
4. Full Cost Recovery: tariffs for a given service shall aim to recover the operating and maintenance cost, including environmental and resource costs, as well as the capital cost as much as possible. The tariff structure shall take affordability of the service and any other subsidies into account.
5. Proximity and Decentralisation: waste management shall be undertaken as close to the source of generation as possible, taking into account geographical circumstances.

3.1.4. Goals

Overall, the goals of the Policy are:

Goal 1: Develop and enforce secondary regulations, standards, guidelines and plans

Goal 2: Strengthen the decentralized waste management model by completing the infrastructure on island and regional level

Goal 3: Ensure effective collection and local treatment of organic waste

Goal 4: Close and rehabilitate at least 50% of island dumpsites

Goal 5: Implement the Single Use plastics phase-out plan and further reduce plastic waste

Goal 6: Provide for Beaches and Public Areas cleaning

Goal 7: Development of a National Data and Information Registry

Goal 8: Design and implement an effective model for Extended Producers Responsibility and Take-Back schemes

Goal 9: Engage the private sector in waste management activities and establish procedures for more efficient involvement

Goal 10: Increase public awareness on waste management, and enhance human resources through training and capacity building

Goal 11: Handle hazardous and other special waste in a safe manner

Goal 12: Coordinate with tourism sector to adopt sustainable waste practices

Goal 13: Promoting Waste Prevention and Transitioning to Circular Economy

The NWMPS is aligned with the Waste Management Act. The Policy introduces important milestones, as well as quantitative targets, to achieve. It covers a 5-year period 2023 until 2027, and it will be reviewed and revised before this period expires.

The preparation of NWMPS has been implemented as part of the Government of Maldives's Clean Environment Project financed by an International Development Association grant from the World Bank.

3.2. CONSULTATION WITH STAKEHOLDERS

During the course of elaboration of the present NWMPS 2023-2027, a number of surveys have been undertaken in various islands and interviews with island councils and users took place.

Feed-back from all Ministerial and other governmental authorities has been received, so as to develop a highly ambitious planning document.

The draft NWMPS 2023-2027 has been presented in two National Workshops on 28 and 29-09-2022.

3.3. WASTE STREAMS INCLUDED IN THE POLICY

The following **waste streams** are included in the present National Waste Management Policy. The types have been selected taking also into account Annex 2 – Special Waste, of the Waste Management Regulation:

- Municipal Solid Waste (including household, commercial and tourism waste)
- Packaging Waste (PW)
- Organic waste (biowaste)
- Waste (Lubricant) Oils (WO)
- End of Life Vehicles (ELV)
- Waste Batteries and Accumulators
- Electrical and Electronic Waste (e-waste) (including solar panels)
- Waste Tyres
- Construction and Demolition Waste (CDW)
- Ship-generated waste (MARPOL)
- Industrial waste
- Hazardous waste
- Healthcare waste

3.4. INTERNATIONAL POLICIES ON WASTE

3.4.1. UN Sustainable Development Goals

The 2030 Agenda for Sustainable Development, adopted by all UN Member States in 2015, provides a shared blueprint for peace and prosperity for people and the planet, now and into the future. At its heart are the 17 Sustainable Development Goals (SDGs), which are an urgent call for action by all countries - developed and developing - in a global partnership. They recognize that ending poverty and other deprivations must go hand-in-hand with strategies that improve health and education, reduce inequality, and spur economic growth – all while tackling climate change and working to preserve our oceans and forests.

The Policy is committed to contributing to the achievement of the respective goals, as follows:

SDG 11: Make cities inclusive, safe, resilient and sustainable

Target 11.6 regards the reduction of adverse environmental impact of cities, by paying special attention to municipal and other waste management.

SDG 12: Ensure sustainable consumption and production patterns

The SDG includes targets focusing on efficient use of natural resources (**Target 12.2)**, environmentally sound management of all waste through prevention, reduction, reuse and recycling (**Target 12.4**) and reduction of food waste (**Target 12.5**). As part of the 2030 Sustainable Development Goals, the United Nations General Assembly adopted a target of halving per capita food waste at the retail and consumer level, and reducing food losses along production and supply chains.

SDG 14: Conserve and sustainably use the oceans, seas and marine resources

Target 14.1 calls for a significant reduction of marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution.

3.4.2. Circular Economy

Circular Economy (CE) is a model which aims at extending the life cycle of products. The shift to a circular economy requires companies to rethink not only their use of resources but also to redesign and adopt new business models based on dematerialisation, longevity, refurbishment, remanufacturing, capacity sharing, and increased reuse and recycling (The EIB Circular Economy Guide – Supporting the circular transition, European Investment Bank, 2020). Reference is often made to three circular business model categories, each of which focuses on a different phase of the value chain: (a) the design and manufacturing phase; (b) the use phase; and (c) the value recovery phase. These different business models can be illustrated in the Figure below:

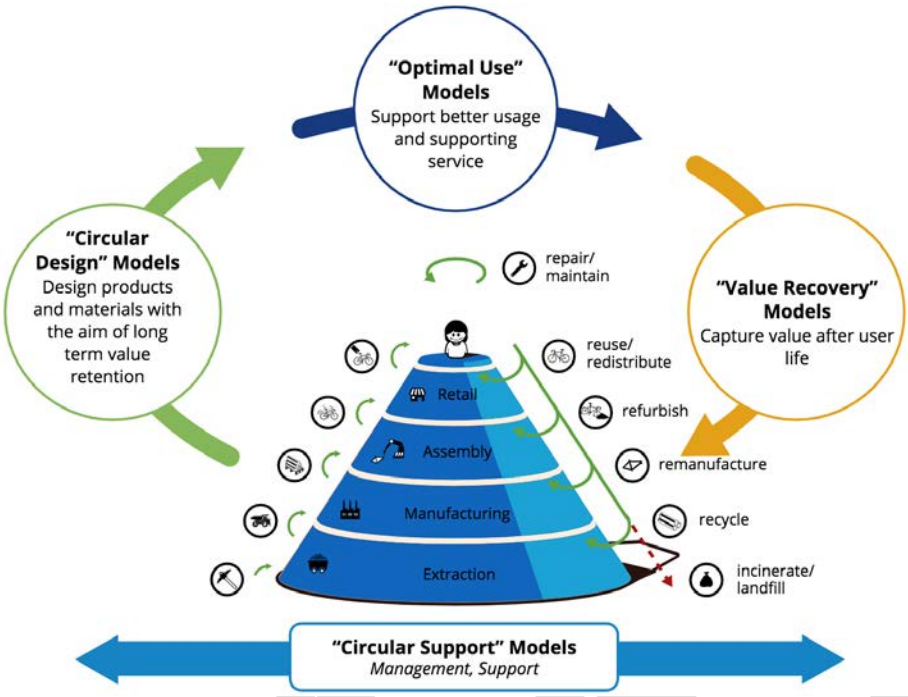


Figure 2: Circular economy business models[1]

Europe has elaborated an action plan for the circular economy, which is compatible with the above three business models, but is built on following five pylons:

Production: Better product design can make products more durable or easier to repair, upgrade or remanufacture. It can help recyclers to disassemble products in order to recover valuable materials and components. Moreover, even for products designed in a smart way, inefficient use of resources in production processes can lead to significant waste generation. Sustainable sourcing of raw material should thus be promoted.

Consumption: consumers play an important role with their everyday decisions. The respective actions are focusing on labelling requirements, greater durability of products, repair, promotion of innovative forms of consumption, and use of environmentally friendly public procurement.

Waste management: This pylon is crucial for the success of CE where long-term recycling targets are set, together with targets to reduce landfill of waste, encouraging more active use of economic instruments, and defining requirements for extended producer responsibility schemes.

From waste to resources: materials that can be recycled are injected back into the economy as new raw materials thus increasing the security of supply. One of the barriers that needs to be tackled regards the uncertainty of secondary raw materials as to their quality.

[1] Elisa Achterberg, Jeroen Hinfelaar, Nancy Bocken, "The Value Hill Business Model Tool: identifying gaps and opportunities in a circular network", 2016 (quoted in EIB Circular Economy Guide)

Priority waste streams: these are focusing on plastics, food waste, critical raw materials, construction and demolition waste, and biomass and bio-based products.

Innovation: create conditions to foster research and innovation in new technologies.

3.4.3. International Conventions and Treaties

The Government of Maldives has ratified various multilateral environmental International Conventions and Treaties related to waste management including:

- Vienna Convention for the Protection of the Ozone Layer
- Montreal Protocol on Substances that Deplete the Ozone Layer
- Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal
- Stockholm Convention on Persistent Organic Pollutants
- Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade
- International Convention for the Prevention of Pollution from Ships (MARPOL)
- Minamata Convention on Mercury

3.5. OVERVIEW OF WASTE MANAGEMENT AND CHALLENGES FACED

The Republic of Maldives is formed from numerous inhabited, uninhabited and resort islands forming atolls, populated by small communities – with the exception of the very dense capital city Male. The relatively low population in the islands results in a wide range of types and levels of **municipal waste sanitary service**, with responsibilities falling on communities with a limited understanding and a difficulty to find sound management options without external support. This is exacerbated by the long **sea transfer distances** and the associated high transport cost. The waste management system in Maldives has a **decentralization** orientation and is implemented through the Island Waste & Resource Management Centres (IWRMC), linked to Regional Waste Management Facilities (RWMF). The Centres serve to separate, process and temporarily store recyclable materials, like plastic, metal, paper and glass. Biodegradable materials including green, yard and food waste are retained at the IWRMCs for bio treatment to produce organic materials for use on the island. The remaining residual waste is transferred to the RWMF. Some IWRMC do not have sufficient space, whereas others have not been fully equipped with the suitable machinery, balers, wood choppers, crushers, etc. Even when equipped, the island's power supply sometimes cannot meet the demand of the IWRMC. Other problems are also faced and have not been solved, making the IWRMC partially non-operable and ineffective. Plans are in place to rectify problems at, and upgrade IWRMCs as required.

Households typically separate domestic waste into four fractions: organics, plastics, other recyclables and residual/other. Waste is collected in a variety of ways including in small open dump trucks, on electric and non-motorized vehicles and in some cases waste is simply carried by households by walking on foot. Waste is put by the sanitation workers to separate bins on the vehicle. Although this process is time-consuming, it has

the potential of achieving high purity. Still, in many cases participation is low, or waste is eventually re-mixed in the vehicle. Open trucks are not a suitable collection vehicle type for wet waste and are moreover reported to be old and face breakdowns.

Island councils charge 100-150 MVR per household per month flat fee, but not all households are registered; commercial enterprises are charged 200 MVR or more. Councils complain that the collection rate is low, and in any case, service cost exceeds revenues. Some councils sell recyclables and receive a small income, whereas in other cases materials & residual waste are stored for longer periods, awaiting clearance and transfer. This creates a lack of public confidence.

Most inhabited islands have a low height above sea level, making it is extremely difficult to find a single suitable location for a landfill and as a result, waste has been usually disposed to dumpsites in an **unsystematic manner**, and typically on an island edge and adjacent to the sea. Because of absence of fencing, lightweight material escapes to sea, floats and possibly accelerates due to low degradation rate. Oftens, **open burning** is still practiced because of the limited site area and in order to reduce the volume. It is well known that through burning, polycyclic aromatic hydrocarbons and a series of noxious gases are released, deteriorating human health and the quality of living.

Figure 3: Dumpsites at Gulhi (left) and Fonadhoo (right) islands

On other occasions, it was reported that inhabitants throw food waste to sea cages[2]. This practice has been verified by the site-visit to Thoddoo and Dhihiggaru islands (organic as well as fish processing waste):

[2] Maafushi and Thulusdhoo, North Male' Atoll, accessed through https://www.adb.org/projects/51077-002/main

Figure 4: Public bins placed near the sea for households to bring kitchen waste, which is afterwards dumped in the ocean by the council staff

Islands, therefore, face a double problem, the lack of landfill space and the restricted income to operate the sanitation service. At the same time, empty plastic PET bottles are scattered for many years in the seaside and the land, and thus have a significant potential to pollute the soil and sea water. It is recognised that **plastic bottles and other plastic items** constitute a high risk for the environment and will be dealt as a priority stream in the Policy.

The situation in Male is much different than in the islands. Capital Male is the administrative, cultural and service centre of Maldives and is very densely populated. Male suffers from a serious **lack of space** which has consequences to the sanitary service. The state-owned company WAMCO founded in 2016, collects and disposes waste in the Greater Male Area, the entire Zone 3, Addu City and Fuvahmulah City, and operates the Vandhoo Regional facility. The door-to-door collection service in Male is daily (7 d/week) and is made from each separate apartment, rather than as a batch lot from the buildings. The waste bags are put to a bin and then loaded into waste collection vehicles. This is a labour-intensive service and falls outside the typical scope of operation of such companies. The sanitary service cost offered in Male is low and does not entail the cost of environmental externalities. The lack of space in Greater Male will make efforts, such as “Recycling on the Go” and source separation of commercial waste, a challenge.

WAMCO operates a **Transfer Station in Male** next to the Tsunami monument, where waste vehicles unload into three sea vessels. Each vessel has a capacity of 300 – 400 tons and make the trip from Male to the industrial island of Thilafushi, once or twice a day. Waste from several resorts and construction sites is also regularly transferred through sea vessels and private contractors. The Thilafushi island site is not an engineered landfill. Burning and spontaneous combustion of mixed waste has been continuing for many years creating serious air pollution and releases of heavy metals. Fire smoke plume was visible in all islands around Male. It has taken extensive work to introduce proper management practices to spread soil to cover the waste mass and eventually extinguish the fire. Considerable efforts and funds have been allocated to remediate and close Maldives’ largest dumpsite in the upcoming years. The active dumpsite is being replaced with a waste to energy site with an engineered ash only hazardous waste landfill estimated to last for minimum 15 years.

Recycling activities in Maldives are limited, mainly because of minimal or no profit, as well as a lack of local demand. In the past there have been few voluntary initiatives. The NGO Parley having conducted a thorough awareness program, receives plastics from all islands, segregates per fraction in the collection center in

Hulhumale, and exports the compressed balls. The activity is funded by donors. There is no significant local recycling market for materials with the majority needing to be transported to the continental mainland India, Sri Lanka or Taiwan. This is further exacerbated by the lack of secondary waste sorting and Separation facilities, although some plans for this have been under discussion, planning, and procurement for several years. A consumption driven way of living can be regarded as responsible for fast growing streams of discarded mobiles, computers, other e-waste, batteries and similar equipment. These items may contain heavy metals, CFC gases and other toxic compounds that are released when disposed to the ground. Similarly, no **take-back scheme** opportunity or separate collection is available in Maldives for old equipment of concern.

The National Policy of 2015 dictates that every individual in Maldives shall reduce and manage waste created within every household, whereas Businesses must be responsible for the generated waste as per the regulations, policies and standards. This sense of responsibility was not achieved so far, as a least cost and low effort path was followed.

In regard to **hazardous waste**, Maldives currently has no effective mechanism for handling it. There is also no comprehensive, regularly reported, and quality checked data available, **and a lack of suitable management facilities** in place. Hazardous waste lies unofficially in the responsibility of Ministry's Environmental Department and it is temporarily stored in Thilafushi. Infectious **Healthcare waste** is the only hazardous stream for which a National Plan was developed for the period 2016-2021. Stakeholders reported that central hospitals are equipped with sterilisation autoclaves that can treat infectious wastes, these are not in operation, and medical waste is often found un-treated in the mixed waste stream.

4. CURRENT WASTE MANAGEMENT SITUATION AND WASTE GENERATION

4.1. Geography, Population and Population forecast

Geography

The Republic of Maldives is located in a north to south direction on the Laccadives - Chagos submarine ridge in the Indian Ocean (Arabian Sea) about 700 kilometers south of the Asian continent's mainland. The country lies about 860 kilometers (km) on a north-south axis and 120 km on an east-west axis. It is an archipelago comprising of 1,192 small islands grouped into 26 atolls, spread over 115,300 square kilometers (km²). For administrative purposes, the Maldivian government organized these atolls into 21 administrative divisions. Comprising a territory spanning roughly 298 km², Maldives is one of the world's most geographically dispersed sovereign states, as well as the smallest Asian country by land area.

Permanent population

The total permanent population enumerated in the latest Census conducted in 2014 was 402,071[3]. Of this total, 167,996 were based in Kaafu Atoll (included Male) and 234,075 in the remaining Atolls.

In the 2020 Statistical Yearbook of Maldives[4], the total estimated permanent population and including refugees, was 557,426; of these 268,868 people lived in Male and the remaining 288,558 in the other Atolls.

Regarding the future permanent population, projections are based on the Report "Maldives Population Projections 2014 – 2054 – Assumptions and Results Analysis", published in 2015 by the National Bureau of Statistics. An annual 1.8% population increase is expected until 2030, while an annual 1.7% population increase is taken into consideration after 2030. In this perspective, in 2025 the total population of Maldives is projected to reach 602,470 persons from which 293,953 will be based in Kaafu Atoll (included Male) (48.8%) and 308,517 persons in the remaining Atolls (51.2%).

Seasonal population (tourists)

Seasonal population was calculated and projected through the evolution of tourist bed-nights in the future taking into consideration the estimated growth rate of GDP in Maldives[5]. 11,000,000 tourist bed-nights were recorded in 2021 for 1,800,000 tourist arrivals[6]. Regarding the future projection (both for tourist bed-nights and GDP), in 2022 the increase is expected to reach 6.4%, followed by annual increases of 5.9% (in 2023), 5.4% (period between 2024 and 2029) and 4.8% (onwards).

4.2. Existing Facilities for Waste Management

The national waste policy is built on the decentralised model with establishment of the Island Waste & Resource Management Centres (IWRMC) in all inhabited islands. The IWMRC are designed to segregate and

[3]MBS 2015, Maldives Population and Housing Census 2014, Statistical Release:1 Population and Housing
[4] MBS 2020, 2020 Maldives Statistical Yearbook
[5] IMF, 2020, Maldives Debt Sustainability Analysis
[6] Ministry of Tourism, 2022, Tourism Yearbook 2021

store recyclable materials - plastic, metals, etc, with a specific area for organic waste composting, and an area for storage of hazardous waste and residuals.

From the 187 currently inhabited islands, sixty-nine (69) islands do not have an IWMRC; the other 118 do own IWMRCs with installed equipment, such as of plastic shredders, glass crushers, compactors (metal/plastic), wood chippers, weighing scales. For some of the necessary equipment (including composting equipment), either a lack of spare parts, or a lack of technical capacity by the island council, or an absence of electrical connection, have been observed. Therefore, there is a need to maintain or replace existing equipment, whereas in few cases, financing mechanisms have been established and procurement is ongoing to make IWMRC fully functional and operational.

Residual waste, as well as useful recyclable materials, which cannot be managed at island level, will be periodically transferred to a regional facility. Maldives is divided into seven regional waste management zones as shown below, to be served by a Transfer Station or a regional facility. In the latter, a state-of-the-art Waste to Energy technology, accompanied by gas emission control system, energy recovery and ash landfill, is foreseen.

Facilities for the storage and management of hazardous/ special wastes, as appropriate, are under planning.

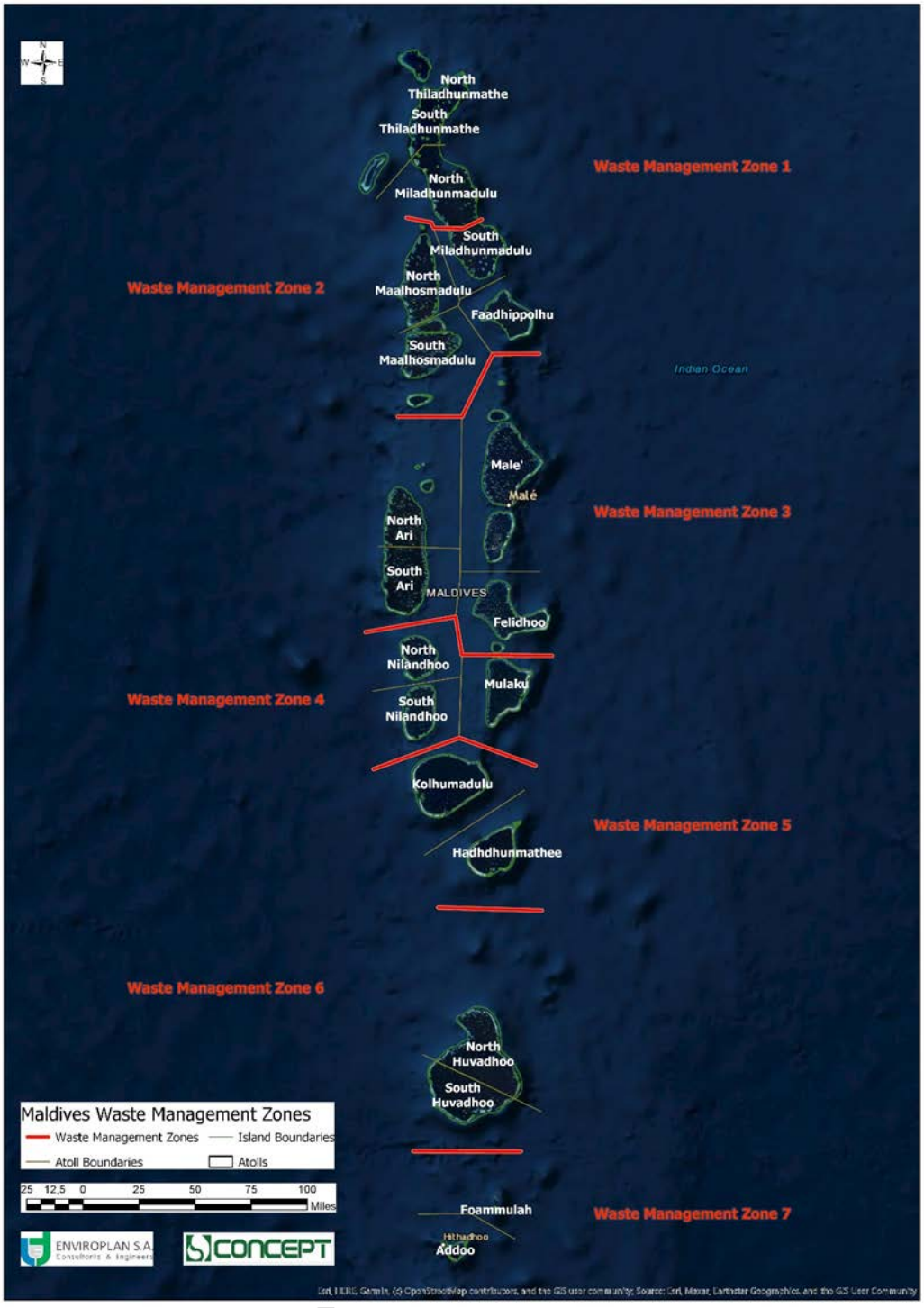


Figure 5: Regional waste management zones in Maldives

Table 1: Regional waste management planning in Maldives

Waste Management Zone	Facilities	Capacity and Status
1 and 2	RWMF in R. Vandhoo TS in HDh.Kunburudhoo	40 t/d Construction is completed and remediation of mechanical works has commenced. It is expected to be completed in 2023
3, 4 and 5	RWMF in K. Thilafushi TS in Dh.Hulhuvehi	500 t/d Construction started and expected to be completed by the end of 2025
6 and 7	RWMF in Addu TS in GDh.Vaadhoo	50 t/d Construction started and expected to be completed in 2023

The total annual capacity of the 3 WtE plants is then 183,000 t/y.

In addition to the Regional facilities, and in order to cover specific needs, the following waste treatment plants are existing or being planned (in Zone 3)

- A plant for the depollution & dismantling of End-of-Life Vehicles
- Baling and temporary storage of municipal waste
- Private (Parley) recyclables storage area (Hulhumale)
- A bottom ash recycling plant and landfill (planned)
- A Construction & Demolition waste crushing plant (planned)

4.3. Municipal Solid Waste (household, commercial and tourism waste)

There are few and deviating available data sources regarding municipal solid waste generation in Maldives (Table 2). The data sources are mostly estimates and have not been based on measurements or seasonal waste audits.

Table 2: Previous estimations in municipal waste generation

Source	Greater Male	Atolls	Resorts and hotels
Feasibility Study for an Integrated Solid Waste Management System for Zone III	Households 0,85-0,9 kg/cap-d Commercial 20% of HH 0,17 – 0,18 kg/cap-d Total 1,02-1,18 kg/cap-d	Households 0,61 kg/cap-d Commercial 15% of HH 0,09 kg/cap-d Total 0,70 kg/cap-d	3 kg/bed-night
Maldives: Greater Malé Environmental Improvement and Waste Management Project	N/A	Households 0,5 kg/cap-d Commercial 15% of HH 0,075 kg/cap-d Total 0,058 kg/cap-d	2 kg/bed-night
Maldives National Waste Accounts 2018 & 2019	Households and Commercial 1,7 kg/cap-d	Households and Commercial 0,8 kg/cap-d	3,5 kg/bed-night

Because of absence of actual data and considering that the figures of 1,7 kg/cap-d (Greater Male) and 3,5 kg/tourist bed-night are excessively high, two possible Scenarios are assessed in this Policy:

- **Scenario 1 (High-rate)**:
  - Household and commercial waste generation rate for Greater Male: **1.5** kg/c-d
  - Household and commercial waste generation rate for the inhabited islands: **0.8** kg/c-d
  - Tourism waste generation rate: **3.0** kg/person-bed night
  - Increase of household and commercial waste generation rate: **2%** annually until 2027, after 2027 **1.5%** annual increase. Constant waste generation rate for tourists
- **Scenario 2 (Medium-rate)**:
  - Household and commercial waste generation rate for Greater Male: **1.2** kg/c-d
  - Household and commercial waste generation rate for the inhabited islands: **0.7** kg/c-d
  - Tourism waste generation rate: **2.5** kg/person-bed night
  - Increase of household and commercial waste generation rate: **2%** annually until 2027, after 2027 **1.5%** annual increase. Constant waste generation rate for tourists

Based on the above assumptions, as well as population forecast shown in § 3.1, the municipal waste generation has been calculated for the whole period 2022 – 2035. The following two tables present the MSW quantities per Waste Management Zone and on a national level for selected years.

Table 3: Municipal Solid Waste generation in Maldives per Waste Management Zone in 2025

	Scenario 1 (tn/y) - 2025			Scenario 2 (tn/y) - 2025		
	Household and Commercial Waste	Tourism Waste	Total MSW Generation	Household and Commercial Waste	Tourism Waste	Total MSW Generation
Zone 1	19,705	1,156	20,861	17,241	964	18,205
Zone 2	25,208	9,416	34,624	22,057	7,847	29,904
Zone 3	190,581	24,245	214,827	153,432	20,205	173,636
Zone 4	8,221	3,056	11,277	7,193	2,547	9,740
Zone 5	9,975	496	10,471	8,728	413	9,142
Zone 6	10,596	1,777	12,373	9,271	1,481	10,752
Zone 7	12,868	1,157	14,025	11,259	965	12,224
Non-admin islands	2,245	0	2,245	1,964	0	1,964
Total MSW Generation	**279,398**	**41,304**	**320,703**	**231,147**	**34,420**	**265,567**

Table 4: Future MSW generation in National level

	Scenario 1 (tn/y)				Scenario 2 (tn/y)			
	2022	2025	2030	2035	2022	2025	2030	2035
Household and Commercial Waste Generation	249,563	279,398	330,694	387,580	206,464	231,147	273,584	320,646
Tourism Waste Generation	35,111	41,304	53,426	67,536	29,259	34,420	44,522	56,280
Total MSW Generation	**284,674**	**320,703**	**384,120**	**455,117**	**235,723**	**265,567**	**318,106**	**376,926**

4.4. Municipal waste composition

The following Figure presents the composition of municipal waste. The organic fraction, i.e. kitchen leftovers and garden/ green waste, has the highest share, 60%, in waste. Among recyclables, plastics and paper have a high percentage of 6% and 7% respectively, whereas metals and glass much lower, 4% and 3% respectively. The remaining fraction of solid waste comprises of textiles, leather, rubber, demolition waste, and household hazardous items such as batteries.

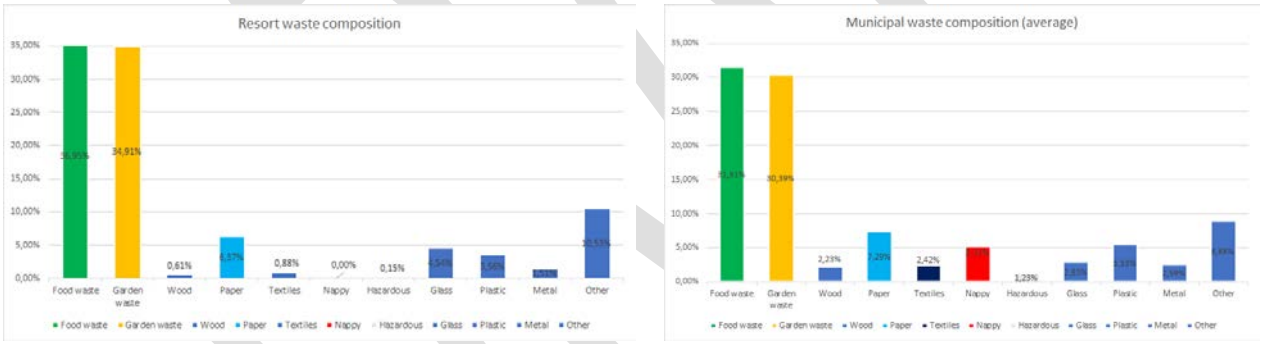


Figure 6: Waste composition of resort islands (left) and average municipal (right) (Source: Waste Audit for Residential Islands in Maldives, Geotech Maldives, 2022)

Based on the above composition, the amounts of relative waste fractions are presented in the following Table.

Table 5: Quantities of relative waste fractions for 2025

	Scenario 1 (tn/y) - 2025			Scenario 2 (tn/y) - 2025		
	Household and Commercial Waste	Tourism Waste	Total MSW Generation	Household and Commercial Waste	Tourism Waste	Total MSW Generation
Food waste	88.038	15.262	103.300	72.834	12.718	85.553
Garden waste	84.909	14.419	99.328	70.246	12.016	82.262
Wood	6.231	252	6.483	5.155	210	5.365
Paper	20.368	2.631	22.999	16.851	2.193	19.043
Textiles	6.761	363	7.125	5.594	303	5.897
Nappy	14.277	0	14.277	11.812	0	11.812
Hazardous	3.437	62	3.499	2.843	52	2.895
Glass	7.907	1.875	9.782	6.541	1.563	8.104
Plastic	15.451	1.470	16.921	12.782	1.225	14.008
Metal	7.236	624	7.860	5.987	520	6.506
Other	24.811	4.349	29.160	20.526	3.624	24.150
Total	**279.398**	**41.304**	**320.703**	**231.147**	**34.420**	**265.567**

4.5. Waste (Lubricant) Oils (WO)

Fresh lubricant oils are distributed to the market via: i) importers, ii) manufacturers, iii) importers of vehicles (coming each year with the registered vehicles). There are no records available for waste oils, however Customs reports quantities of lubricating oils put on the market. Approximately 60% of oil that is "put on the market" will become waste oil. The remaining is lost during use or through leakages, etc. The main generic sources of WO are: i) vehicles repair shops and gasoline stations, ii) industrial facilities, iii) port reception facilities, as applicable.

Table 6: Lubricant oils put on the market in Maldives and generated waste oils (source: Maldives Customs Service and authors' assumptions)

Year	Lubricant oils (t)	Waste oils (t)
2019	4.171	2.503
2020	3.045	1.827
2021	4.368	2.621

Waste oils are characterized as hazardous. In this sense, oils have to be first collected from the producers by licensed companies only and afterwards either incinerated under controlled conditions or re-generated through a complex process (not likely for Maldives). Since they have a positive market value, WO are used as fuel in non-authorised applications.

4.6. End of Life Vehicles (ELVs)

Ministry of Transport provides data for registered and de-registered vehicles in Maldives. De-registration of a vehicle can be done for various reasons, for example if it is not repairable or burned or simply too old and the last owner wants to discard it. There is no data available regarding the average lifetime of a car or motorcycle.

From the de-registered vehicles given in the official figures, the relevant types of interest are motorcycles, cars and private vehicles with capacity up to 9 passengers. Other vehicles such as buses, ambulances or professional machinery (lorries, excavators, etc) are not considered. The composition and weight of cars changes with time. As a general trend, ferrous & nonferrous metals percentage (currently around 75%) is decreasing, since metal parts are substituted with more light plastic or composite parts, whereas weight is also decreasing. An average weight for each category is assumed, which leads to a generation of **110 – 210 t/y** (Table 5).

Table 7: Generation of ELVs in Maldives (source: Ministry of Transport and authors' assumptions)

Type	Average Weight (kg)	Number of de-registered vehicles					
		2016	2017	2018	2019	2020	2021
Battery Scooter	45	1	8	16	22	11	20
Motor cycle	80	144	155	253	288	214	298
Car	1,100	45	25	26	44	38	72
Pick-up	3,000	9	14	18	18	8	13
Van	2,000	23	13	16	23	12	23
Jeep	1,900	8	1	9	1	11	11
Total quantity, t/y		**149**	**110**	**153**	**174**	**128**	**210**

An ELV facility has already been constructed in Thilafushi. ELVs must be collected and transferred to Thilafushi, where the shipment costs must be covered either by the value of materials or through an "Advance Recycling Fee", paid at the first time of registration.

4.7. Construction and Demolition (C&D) Waste

Construction and demolition waste (CDW) is the left-over material from activities such as:

- the construction of buildings and civil infrastructure (roads, airports, ports, etc)
- demolition of buildings
- demolition of civil engineering works

CDW consists of various material, such as excavated soil, concrete, bricks, gypsum, asphalt, wood, glass, metals; many of this material can be recycled. Even though this waste can be characterized as inert, the

respective quantities grow sharply, a fact which is unbearable from an environmental point of view. The construction industry in Maldives does not take into account the life-cycle, i.e. recycling cost of CDW.

Intense public development in Male and Maldives is anticipated: the island of Hulhumale will be further developed to host housing and office buildings; whereas in 2022, MoT has announced a Bid for the Lease, Development, Operation and Management of Tourist Resorts in 18 uninhabited islands. At the same time, there are many private works for reconstruction of existing buildings or hotels.

The C&D waste from Male and Hulhumale is daily transferred with sea vessels to Thilafushi for disposal. The daily amount has been estimated to 500 t/d (**182.500 t/y**) (*source: Maldives National Waste Accounts 2018 & 2019)*.

Currently, construction materials (sand, aggregates) are imported. Some C&D waste is used for backfilling or for blocks for coastal erosion protection. Demolition of buildings is very expensive. Overall, C&D waste is a difficult stream to manage.

The legal framework must be developed to oblige producers for C&D waste sound handling and treatment, as simple technical solutions are available, indicatively a planned C&D crusher in Thilafushi. The crushers receive mixed material such as bricks, concrete, limestone, etc and generate sorted fractions of sand, gravel or other aggregates, in sizes 0-60 mm. The products can be used as base or sub-base material in road construction or other backfilling applications.

Such crushers are heavy duty and can remove ferrous materials, whereas certain models are suitable to also break bulky and green waste. Crushers are typically mobile units on caterpillar and can be shared (leased) - transferred to islands on a platform. It has to be further considered in the future the location of the construction applications, in order to minimise the transfer of waste and recycled aggregates.

4.8. Waste Batteries and Accumulators

Batteries and accumulators play an essential role to ensure that many daily-used products, appliances and services work properly, constituting an indispensable energy source in our society. There are various types of non-rechargeable batteries in the market: Zinc, Alkaline, Button alkaline, Silver zinc, Button zinc, Lithium ion, etc. Rechargeable batteries on the other side consist of: Lead, Nickel-cadmium, Lithium, Alkaline, etc. Batteries separate collection and recycling helps to recover dangerous substance on one hand (lead, mercury, cadmium) and save resources on the other hand.

It is necessary to distinguish between portable batteries and industrial /automotive batteries and accumulators. A working definition can be “Portable battery or accumulator means any battery, button cell, battery pack or accumulator that:

(a) is sealed; and

(b) can be hand-carried; and

(c) is neither an industrial battery or accumulator nor an automotive battery or accumulator”

Comtrade does not report weight nor quantities of imported batteries and cells, it reports only trade value. As there is a large variety of battery sizes and types, a very crude approximation can be made by assuming an average cost of 0.65$ and 12g each:

Table 8: Portable batteries put on the market in Maldives (source: Maldives Customs Service)

	Trade value ($)	Weight (t)
2017	1,317,910	24.3
2018	2,456,224	45.3
2019	2,345,485	43.3
2020	N/R	N/R
2021	2,386,832	44.1

It can be seen that approx. **24 - 45 t/y** of "fresh" portable batteries are put on the market in the period 2017 – 2021, i.e. an equivalent annual quantity can be considered as waste. In addition, there is a smaller quantity of portable batteries that comes embedded in imported electrical equipment such as watches, laptops, cameras, toys, etc.

Portable batteries are generated in the households and are mixed with household waste.

In regard to the automotive and industrial accumulators, the dominant type is the lead-acid type compared to the NiCd type. These are used for ignition/lighting of motorcycles & cars, on electric vehicles and other industrial applications.

Comtrade does not report weight nor quantities of imported accumulators, it reports only trade value. Again, there is a large variety of accumulators sizes, weights and types (Li ion are lighter but more expensive). A very crude approximation can be made by assuming a dominant, closed lead-acid, motorcycle accumulator at average cost of 45$ and 4kg each:

Table 9: Accumulators put on the market in Maldives (source: Maldives Customs Service)

	Trade value ($)	Weight (t)
2017	1,747,513	155.3
2018	5,434,804	483.1
2019	2,628,402	233.6
2020	N/R	N/R
2021	4,473,030	397.6

Since around **150 – 490 t/y** of new accumulators are put on the market, an equal amount becomes waste. An additional small quantity enters the market via import of new or used vehicles to Maldives.

Waste accumulators are generated in vehicle repair shops, gasoline stations and spare part shops. Lead has a high value, therefore with a significant potential for collection and recycling.

Recycling of batteries is a large-scale technology and is not applicable for the Maldives, therefore they need to be exported. Recycling of lead accumulators is possible, after acid solution is removed and neutralised.

4.9. Waste Electrical and Electronic Equipment (including solar panels)

EEE includes a wide range of products with circuity or electrical components with a power or battery supply. Almost any household or business use products like basic kitchen appliances, toys, tools to music, and ICT items, such as mobile phones, laptops, etc. EEE becomes e-waste once it has been discarded by its owner as waste without the intent of reuse[7].

E-waste (or in Europe WEEE) is worldwide a diverse and very fast-growing stream. E-waste may contain hazardous substances such as mercury, cadmium, fluorocarbons or brominated compounds. At the same time, it contains rare-earth and other precious elements. It is important therefore that an official collection, dismantling, depollution and treatment network is established on national level. Because of the serious environmental concerns, management of e-waste is included in the 17 Sustainable Development Goals (SDGs) of the UN and in particular under SDG 12.5.1: National recycling rate and tons of material recycled (e-waste sub-indicator).

It is mentioned that e-waste is one of the oldest streams being regulated in Europe and falling under the EPR principle. Nevertheless, as high as 65% of the generated amount in Europe was either exported, or recycled under non-compliant conditions, or scavenged for valuable parts, or simply thrown in waste bins[8]. This fact indicates that there are no simple management solutions, even in countries with a long-established waste policy system.

With the international efforts to shift from carbon economy to renewable energy, solar panels and wind farms have been installed. As the useful life-time is around 20 years, many of them will reach their end in the upcoming years in Maldives. Recycling of both is a challenge and few technologies are emerging to avoid landfilling.

For solar panels, technologies are available that separate and recycle the panels' components, namely the glass, the aluminium frame, cabling and the silicon compound. The technologies are not economical for the scale of the Maldives and solar panels have to be exported. In any case, it is proposed that new products should have an "Eco-design label", in order to promote durability, reparability and recyclability.

The Global E-waste Monitor 2020 has estimated generation in Maldives to **3,400 t** (for 2019). These amounts are generated mostly in the households, are completely disposed together with mixed waste and probably burned (Figure 8).

[7] The Global E-waste Monitor 2020 Quantities, flows, and the circular economy potential
[8] Countering WEEE Illegal Trade (CWIT) Summary Report, 2015

Figure 7: e-waste disposed to Thoddoo dumpsite.

4.10. Waste Tyres

End of life tyres (or ELTs) are a global waste problem. They consist of natural and synthetic rubber, steel, textiles and additives which can be easily recovered. Indeed, recycling of ELTs results in greatly reduced carbon emissions in the overall manufacturing process. Furthermore, ELTs disposed in landfills are breeding place for rodents and mosquitos. In Europe, the disposal of used tyres in landfills is prohibited.

It is possible to estimate indirectly the amount (t per year) of generated ELTs via the number and type of automobiles registered in the country (as given by the Ministry of Transport), the tire weight, the number of tyres per vehicle and a typical replacement every 4 years:

Table 10: Generation of ELTs in Maldives (source: Ministry of Transport and authors' assumptions)

Vehicle Type	Number of Tyres	Average Tyre Weight (kg)	Number of Vehicles Registered					
			2016	2017	2018	2019	2020	2021
Motor cycle	2	4	7,793	7,559	9,194	11,592	6,312	9,319
Car	4	8	480	412	510	802	678	932
Pick-up	4	16	296	264	273	200	123	183
Van	4	16	115	110	104	133	93	134
Jeep	4	16	22	25	22	41	25	28
Battery Scooter	2	4	107	436	380	320	233	306
Bus	8	20	16	18	30	6	6	5
Total ELTs, t/y			**27.2**	**26.4**	**30.8**	**36.5**	**22.6**	**32.4**

The above ranges from **26 to 37 t/y**, to which a small amount of ELTs generated from abandoned vehicles must be added.

As waste tyres have high calorific value, a mixture of both recycling and incineration options are valid management methods.

4.11. Ship Generated Waste

Discharges of waste to the sea endangers the marine environment and the species that swallow non-degradable debris or plastics. Oil spillages by the ships seriously pollute the sea with dangerous hydrocarbons. Uncontrolled discharges have been a major threat to the global marine ecosystems with environmental, economic and social consequences. The MARPOL 73/78, developed by the International Maritime Organization (IMO), is one of the most important international conventions for the prevention of pollution from ships, and has been also ratified by the Maldives.

The MARPOL convention contains provisions in order to regulate the availability of adequate Port Reception Facilities (PRF), which types of ship-generated wastes can or cannot be discharged into the sea, onboard waste management, enforcement and inspections[9].

MARPOL is divided into 6 technical Annexes according to various categories of pollutants:

- Annex I: Prevention of pollution by oil & oily water [1983].
- Annex II: Prevention of pollution by noxious liquid substances in bulk [1983]. No discharge of residues containing the 250 listed noxious substances is allowed within 12 miles of the nearest land.
- Annex III: Prevention of pollution by harmful substances carried by sea in packaged form [1992].
- Annex IV: Pollution by sewage from ships [2003]; Prohibits discharge of sewage with exceptions: 1. the ship operates an approved sewage treatment plant; 2. the ship discharges comminuted and disinfected sewage, more than three miles from the nearest land; 3. the ship discharges sewage which is not comminuted and disinfected, more than 12 miles from the nearest land.
- Annex V: Pollution by garbage from ships [1998] and includes food waste, cooking oil, Animal carcasses, plastics, fishing gear, etc
- Annex VI: air pollution from ships [2005]. Limits SOx and NOx emissions in ship exhaust gas, bans deliberate releases of ozone-depleting substances and designates emission control areas with stricter standards for SOx, NOx and particulate matter.

Some of the categories concern hazardous and other non-hazardous waste. Also, waste oils from ships should preferably not be mixed with fuel and emulsified residues. MARPOL requires the provision of adequate Port

[9] Guidelines: Provision of Reception Facilities in Ports and the Delivery of Ship-Generated Wastes; UNEP/MED IG.24/22 Decision IG.24/11

Reception Facilities in each port, that can be used by the ship masters to deliver ship-generated waste. All ship types have to comply with the relative provisions.

In Maldives there are three international public ports: i) Male Commercial Harbour, ii) Hdh.Kulhuduffushi Port and iii) S.Hithadhoo Port. There are also 11 private ports, industrial (Petrolium Link, Velana airport, Maldives Gas) and commercial.

At present, there are no reception facilities in the ports and of course there is no fees charging system. This fact regards a gap in the country, as Maldives mostly rely on sea transport for passengers and goods to/from the islands.

4.12. Industrial Waste

There are only few significant industrial activities in Maldives. Three relevant industrial sectors are i) boat construction / repairing industry, ii) fish processing and iii) airport generated waste, from base maintenance and cabin (catering) waste.

For boat construction / repairing, the main type is fiberglass waste. In Raa. Alifushi island[10], the council indicated first that waste management is very challenging and second that it is not made in accordance to the Polluter's Pay principle.

Fiberglass waste is, however, compatible with the incineration process and it will be thus directed to the Regional facilities, as a concrete technical solution.

In regard to the fish processing industry, main waste regards the non-edible parts if fish. The Dhiggaru council[11] indicated that organic fish waste is thrown to ocean (Figure 8). The fish company MIFCO[12] in Felivaru island has a daily capacity of 40-45 t/d of fish (pouch and canned tuna), 750 t of frozen fish storage and 4 fish collecting vessels. The company claimed that fish waste is either given as poultry feed or is composted together with seaweed from the beach. Metal scrap from cans amounts to 3% of total waste.

[10] Field survey
[11] Field survey
[12] Field survey

Figure 8: Preparing fish for processing – Fishing and fish processing is main economic activity in Dhiggaru. Fish waste is thrown into the ocean by individual businesses processing fish

During the maintenance process of aircrafts, waste oil is generated. It is also mentioned that in some countries catering waste from international flights is deemed as potentially biohazardous, based on animal health concerns (transmissible spongiform encephalopathies, etc). EU for example has very strict requirements for catering waste of animal origin from means of transport operating internationally. As there is no such local regulation in the Maldives, catering waste cannot be characterised as hazardous or special.

In any case, such sources can be directed to the Regional facilities for incineration, as a concrete technical solution.

Possible other types of industrial waste regard expired chemicals and empty containers.

Currently, no data is reported in the National Waste Accounts. Industrial waste entering Thilafushi site was reported in the Feasibility Study, amounting to 2,200 t/y.

4.13. Hazardous Waste

There are no records available for hazardous waste and the respective amounts cannot be estimated. It can be assumed that the current practice is mixing with municipal waste.

The National Implementation Plan for the Stockholm Convention indicates that the Maldives has banned POPs pesticides, already before international ban. It can be assumed that in general there are certain HW generated from empty (approved) pesticide containers and possibly from leftover pesticides. Polychlorinated biphenyls (PCBs) is another class of priority hazardous chemicals, possibly still in use as a cooling fluid in electric transformers. The Plan has identified 10 potentially PCB contaminated sites in S. Hithadoo, S. Feydhoo, S. Gan and GN. Fuvahmulah.

Other types of hazardous waste regard waste oils, expired medicines, some types of e-waste, batteries and empty containers of chemicals. For the last case, a common acceptable practice is to wash the container to remove all traces of compounds.

The Feasibility study for hazardous waste system provided recommendations for two HZW Facilities that will mainly serve for intermediate storage and subsequent transport (export) to recycling, recovery or disposal facilities abroad. Own treatment was not considered because of the low quantities that generate high specific costs. Standard Operating Procedures (SOPs) will be also developed as part of the project.

4.14. Healthcare Waste

Health-care waste (HCW) or medical waste refers to waste, that may have dangerous and infectious character. It is commonly produced by almost all health service structures such as hospitals, research centers, dentist, etc. A poor management may cause serious problems to human health and to the environment. Indeed, a safe management is required from the initial stage of production until the processing stage.

The World Health Organization (WHO) has classified healthcare waste into categories such as:

(i) Sharp waste, needles, syringes, etc

(ii) Infectious waste, such as waste contaminated with blood, laboratory cultures, microbiological stocks, materials in contact with patients infected with highly infectious diseases, etc.

(iii) Pharmaceutical waste and cytotoxic or cytostatic drugs that are often used in cancer therapy, etc.

(iv) Chemical waste such as laboratory reagents and broken mercury thermometers

(v) Radioactive waste (minor quantities from radiotherapy)

(vi) Non-hazardous (municipal type) waste

Around 75% of the waste produced in health-care institutes is comparable to domestic waste, i.e. non-hazardous. The remaining 25% is characterised as hazardous and must be segregated.

Health-care waste generated in Maldives is unknown and can be estimated based on the number of beds in the medical institutions. This data was requested from the Ministry of Health and is pending. Nevertheless, the Indira Gandhi Memorial Hospital, which has 370 - 400 hospital beds, provided following data:

- Iinfectious waste 1.5 tons per day
- Cardboard and other general non-hazardous waste 4.5 tons per day

According to the above, IGMH produces in average 3.75 Kg of infectious waste per hospital bed per day.

For the proper management of waste within a medical unit, there are two pre-conditions: i) the obligation to elaborate a healthcare waste management plan with specific measures, ii) the appointment of a competent responsible person or environmental manager. In principle, collection & transportation of infectious waste from healthcare institutions to treatment - sterilisation or incineration facilities, shall be performed by authorised operators holding all necessary permits.

The Health Protection Agency has elaborated the draft National Health Care Waste Management Guideline, as well as Standards for mercury and cytotoxic waste management. The documents prescribe necessary procedures for adoption by the Healthcare institutes. A barrier exists here that no technical personnel is

available and the sterilisation autoclaves are not functioning. A national health care waste management policy is being formulated, also a health care strategic action plan is being drafted (initial meetings held).

Healthcare waste that has undergone a sterilization process is regarded as non-hazardous, and can be afterwards directed to the WtE plant. The feasibility of establishing a central healthcare waste facility (high T incineration) must be assessed in the future, considering that the autoclaves in the hospitals are not in operation whereas for some types of waste incineration is the only possible route.

5. POLICY AND LEGAL FRAMEWORK

5.1. STRATEGIC ACTION PLAN (SAP) 2019 - 2023

The 2019 – 2023 Strategic Action Plan (SAP) outlines the developmental targets and priorities of the Maldives Government for the five-year period 2019 – 2023. It sets out realistic strategic goals that would help achieve key developmental milestones.

Waste and Resource Management is an important Sub-Sector of the Plan, under Sector 4 titled "Jazeera Dhiriulhun". The term "Jazeera Dhiriulhun" literally translates into "island life". It conceptualizes a development model in which citizen engagement, inclusivity, and sustainability are at the core. The ideology behind "Jazeera Dhiriulhun" centres around living in harmony with the island environment, where citizen's livelihoods, economies, cultural identity, and well-being are derived sustainably through connectivity and management of natural resources. Citizen's voice and agency is recognized as a fundamental aspect of the Jazeera Dhiriulhun concept.

This sector consists of the following subsectors;

(i) Decentralization,

(ii) Transport Network,

(iii) Environmental Protection and Preservation,

(iv) Clean Energy,

(v) Waste as a Resource,

(vi) Water and Sanitation,

(vii) Resilient Communities,

(viii) Information, Communication, and Technology, and

(ix) Arts, Culture and Heritage.

Regarding Waste as Resource sub-Sector, four (4) Policy Axes are defined:

- **Policy 1**: Promote waste as a valuable resource for income generation
- **Policy 2**: Improve chemical and hazardous waste management practices to ensure protection of people and the environment
- **Policy 3**: Reduce plastics pollution by phasing out single use plastics
- **Policy 4**: Install environmental values in the society and promote environmentally friendly lifestyle

The Policy Axes are associated with quantifiable targets in specific time frames.

5.2. WASTE MANAGEMENT ACT

The new Waste management Act was published in the Gazette in the end of 2022, following a given period for public comments. The Act is divided into 14 Chapters and runs to 77 sections. The principal object of the Act is to establish the legal and institutional framework for the sustainable management of waste; establishment

of a system of waste management in each inhabited island within 5 years; the delivery of waste management as a public service; the establishment of a penalty system for those who violate the law; increase private sector participation, introduce polluter accountable principle and impose a MVR 2/- levy on plastic bags.

The structure of the Act can be seen in Figure 5. It is mentioned that Chapter 3, article 10 provides for the responsibility of the Ministry; article 11 provides for the responsibilities and powers of local (island or Atoll) councils; article 12 provides for the responsibilities and powers of the Environmental Protection Agency (EPA); and finally article 13 provides for the responsibilities and powers of Utility Regulatory Authority (URA). In brief:

- The Ministry shall develop regulations and standards; it is responsible for the overall planning, determine national waste management goals, provide financial assistance to local authorities, monitor how councils deliver waste management services and gather waste statistics
- URA has inspection and enforcement mandate; it issues, renews and cancels licenses; it is responsible for monitoring of waste management services; URA is also responsible for the approval of the Regional WM plans as well as for the Operational plan of the service provider
- Island councils shall implement waste management service at local level; determine the waste management tariff pursuant to the methodology prepared by the URA; prepare the WM plans and revise the Plans every 5 years
- EPA shall issue approvals of the above Island WM plans; prevent the possible impact on the environment following accidents due to waste
- It is not defined in the Act which entity is responsible for the preparation of the Regional Plan

Chapter 15 art 62 – 64, provides for “Fines to any party who disposes waste declared to be hazardous waste in places other than the designated locations, or treats such waste without the authority’s permission.” It also provides for “fines to any party who is notified to provide information but fails to do so”.

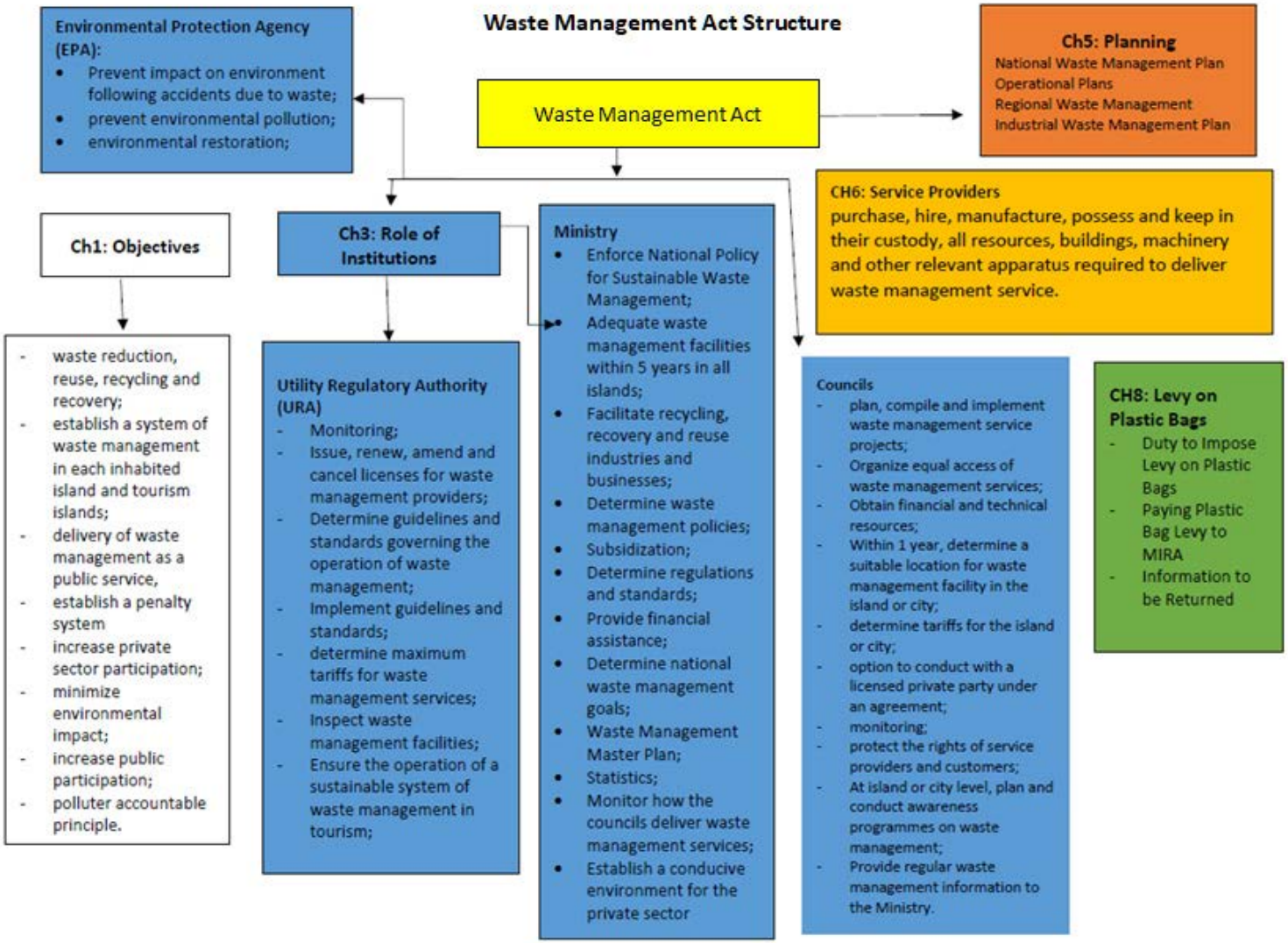


Figure 9: Structure of Waste Management Act

5.3. SINGLE USE PLASTICS BAN DECREE AND PHASE OUT PLAN

The Single Use Plastics (SUP) Phase Out Plan and the accompanying Ban Decree 2021/9 are two very important instruments for the regulation and gradual phaseout of SUP in Maldives. The strategic importance for Maldives is also repeated in the Strategic Action Plan (SAP) 2019 – 2023.

The group of products together with the associated date that their production and sale shall be discontinued, i.e. as of June 2022, are listed. Such products are:

- Drinking straws
- Plates, cutleries and stirrers
- Styrofoam lunch box
- Shopping bags below 30x30cm
- Shopping bags below 50 micron thickness
- Drinking Cups
- Cotton pads
- Shampoo, soap, conditioner and lotion bottles
- PET water and beverage containers

Policy 1 of the Plan refers to a direct “Ban the import, Production and Sale of specific SUP products”.

On the other side, Policy 2 regards “Market based Instruments” that aims to discourage their use by, for example increasing the tariff or setting a levy or to encourage the use of alternative products by Duty exemptions.

Policy 4 is very important for Maldives, as it indicates the onset of the Extended Producers Responsibility policy for plastics and the passing of the legislation on EPR on Packaging.

Finally, the Plan is accompanied by three more Policies, Strengthening of national waste database (#3), the sustainable provision of alternatives (#5) and the Education & Awareness (#6).

The implementation of the import ban and the sales ban has already started, as of 1st June 2022 (Policy 1). The implementation of the Plan by the Customs and the creation of new HS codes (Policy 3) is proceeding according to the Plan.

Also, the new Act sets a levy of 2 (two) rufiya per bag, charged at the point of sales. A list of items charged with 400% tariff and 0% tariff shared will be incorporated in the next Import - Export Law.

In regard to the Education and Awareness (Policy 6), the “PlastikaaNulaa” (official name meaning “WithoutPlastic”) awareness campaign was launched.

The implementation of EPR (Policy 4) and the determination of national collection & reduction targets (Policy 3.2) is on-going.

5.4. WASTE MANAGEMENT REGULATION (2013) AND AMENDMENT

The Solid Waste Management Regulation was drafted by the Ministry of Housing and Environment in 2010 and has been in effect since 2013 with the aim of implementing the first National Solid Waste Management Policy formulated in 2008. The administrating authority for the regulation was identified as the Environmental Protection Agency at the national level and island/city councils at the provincial level. Following the 2021 5th amendments of the Regulation, the URA was introduced as the competent authority.

The Waste Management Regulation 2013/ R-58, aimed to implement national policies regarding waste management by:

- ✓ Minimizing the direct and indirect negative impact caused to human health and the environment due to waste
- ✓ Compiling the standards to be maintained in relation to waste management
- ✓ Establishing an environmentally friendly, safe and sustainable waste management system through an integrated waste management structure
- ✓ Encouraging minimizing, reusing, recycling and recovering of waste
- ✓ Implementing polluters pay principle
- ✓ Introducing extended producer responsibility

Parts II, III, IV and V of the Regulation provide detailed clauses on the following:

Part II – Waste management measures. This part highlights detailed clauses on waste management standards and plans, declaration of priority wastes, plans for extended producer responsibilities, prohibition of unauthorized disposal of waste, littering, collection containers in public places, waste collection at sea and waste collection facilities at ports, reduction, reuse, recycling and recovery of waste, waste management activities list and restrictions on provision of waste management services.

Part III – Waste Management Licenses. This part introduces clauses on roles and responsibilities for waste management licenses, license periods and licensing requirements, standards to be observed by licensees, bundling of services and transferring or surrender of license, waste management license fees and how to charge the relevant fees, financial securities and the license register.

Part IV – Transportation of waste. This part introduces clauses on roles and responsibilities of persons transporting waste and duties of receivers of waste, export and transboundary transportation of hazardous waste, transportation of waste from one island to another and accidents at sea.

Part V – Monitoring, Inspection, Auditing and Enforcement. This part gives detailed clauses on responsibilities to furnish information and duty to report, notice from the Administrating Authority requiring a review of activities carried out under a license, revocation of a license, defrayal of Administrating Authority costs, register of fines and administrative actions, Inspectors, establishment of a national waste information system and National waste management status reports.

The 5th Amendment which was brought in 2021 to the Solid Waste Management Regulation introduced the need for waste in all islands except Male, needs to be segregated into followings categories at the source or point of waste generation:

- Food waste and other biodegradable waste
- Plastic bottles
- Alloys, metals and glass waste
- All other materials except for those mentioned above,

whereas, waste produced in Male' must be sorted into the following parts:

- Food waste and other biodegradable waste
- Plastic bottles
- All other materials except for those

Whereas, bulky waste must be disposed on specified days and in compliance to guidelines set by the city or island councils.

According to article 67 of the draft Waste Management Act, "*The waste management laws and regulations established prior to the implementation of this Act should be implemented until the formulation and publication of the relevant regulations that need to be completed under this Act.*" Therefore, the Solid Waste Management Regulation remains in force.

6. PROPOSED WASTE MANAGEMENT SYSTEM

This chapter presents where we want to go in the future in waste management, and what we want to achieve.

6.1. Cease of open burning and closure of dumpsites

Disposal in dumpsites and open burning in the Maldivian islands is still a reality, as a result of lack of space, reduced capacity or financial problems. Open dumping, and especially burning, cause air and water pollution and constitute a serious threat both to public health and the environment. The deterioration of nature is not acceptable. The 2019 – 2023 Strategic Action Plan (SAP) has already set target 1.2, "*open burning of waste is minimised by 50% in all inhabited islands by 2023*".

The Regional facilities in WM Zones 1 (54 inhabited islands), 2 (32 inhabited islands), 6 (18 inhabited islands) and 7 (7 inhabited islands), as well as a significant number of IWRMCs, are expected to be operational by end 2023. All pre-sorted municipal waste generated in the islands will be treated in the IWMRC and temporarily stored. The residual waste is expected to be transferred to the Regional facilities. Afterwards, all dumpsites can be closed, fenced (no access will be allowed) and rehabilitated in accordance to the standards developed by MoECCT.

After the implementation of the Regional facility in Zones 3, 4 and 5, closure of all remaining dumpsites will be possible.

6.2. Improvement of island segregated collection and treatment system

Current municipal waste generation in Maldives was estimated above to **235,000 – 285,000 t/y**. Waste management in Maldives is decentralised and organised on island level. The collection service is delivered as "door-to-door" type, nevertheless via open trucks some of which are outdated. Following the implementation of the 5th Amendment of Waste Regulation, citizens have to bring waste segregated in four bags. In many cases, a pre-sorting is made by the workers on the truck, a practice with possible safety concerns. With the implementation of the Island Waste & Resource Management Centres, one per island fully functional, waste will be handled locally: Sorting, storing, and organics composting can be effected at island or Atoll level. Recyclables will be still in low quantities to be collected by international recyclers. Therefore, residual waste and the valuable materials will be periodically transferred via sea vessels to the regional facilities.

The Policy, aiming to foster sustainable development, foresees the following treatment of segregated municipal waste generated in the islands:

- Kitchen and green waste (organics or biowaste): this fraction will be locally (or within the Atoll) composted (windrows or in-vessel composting or anaerobic digestion where appropriate), raffinated and given for free to agriculture sector
- Recyclables, plastics, paper, aluminium, ferrous (tin cans), other: temporarily stored, balled (optionally) and transferred by sea vessels to the Regional Center; the amounts will be periodically tendered for recycling
- Glass: there is currently no market, so it will be crushed (optionally) and given to construction industry as aggregate for low quality applications (road construction) or exported for recycling

- Residual waste: temporarily stored, balled (optionally) and transferred by sea vessels to the Regional Facility for incineration

As indicated in §3.4, the organic fraction (kitchen leftovers and green waste) has a portion as high as 60%. It is very crucial that organic waste is separately collected and treated within the island, rather than transported to the regional facilities. Composting is a globally acknowledged process; it has been practiced in pilot islands and documented to be successful; Awareness campaigns, such as the Soneva Namoona initiative, have already targeted this stream, and such efforts must continue. Biowaste has to be put by citizens in the bag as clean as possible, so as to achieve a high quality product.

For the other special waste streams (batteries, e-waste, tyres, vehicles, etc.), these will be transferred by sea vessels to the proposed Hazardous Regional Facility or to the ELV dismantling workshop. Eventually the handling of special waste shall be organized and undertaken by EPR systems called Producer Responsibility Organisations (PROs), as described in § 4.4 and § 4.5. For bulky waste such as furniture, a special pick-up service can be organized or this can be brought directly by the owner to the IWMRC at a given time.

So far, 112 Island Waste Management Centers have been constructed and are operational in Maldives. In order for a Waste & Resource Management Center to serve effectively and independently the island, the following equipment and works must be installed (list as complete as possible but indicative):

- Mechanical composter or alternatively simple open composting plant comprising of asphalt plateau, skid loader(s), green waste chipper, geotextile cover (for maturation stage), refinery screen, water tank, leachate lagoon
- Baller for residual waste and recyclable material
- Area with moving belt or open platform to segregate recyclables
- Glass crusher
- Skid loader or Front loader
- Connection to local electricity supply or Diesel power generator
- Solar panels (optional)
- Fence
- Open or closed containers
- Collection vehicles, 120l – 240l bins different colours, home composters (optional) and compostable bags or kitchen caddies for kitchen waste or special bins for parks/ hotels/ markets/ restaurants.

Ballers can serve to prolong storage and optimize the sea transport frequency, approx. every 3-6 months, otherwise waste must be transferred every 1-2 weeks.

The exact needed machinery can be identified in the Island WM Plans based on the generated waste amounts. It is noted that as part of the ADB funded Greater Male Environmental Improvement and Waste Management

Project, the configuration of the collection system, the number of collection points and the needs are specified for inhabited islands in Zone III[13]. Similar studies must be conducted for all Zones.

It should be investigated by the Councils, whether two or more islands can be served by a joint Center or a joint composting plant.

Finally, two more points are noted that will allow the improvement of the waste collection:

1. more outdoor bins must be placed in the islands and especially in the beaches, in order to avoid littering of waste, including cigarette butts that are one of the most littering items.

2. outdoor collection points for segregated material must be placed in the islands to enhance "Recycling-on-the-Go":

Figure 10: a) Oudoor Street collection point for recyclable materials, b) Oudoor Street collection point -bell type for paper, c) bin for cigarette butts with "anti-littering" public message (own source)

[13] ADB Environmental Monitoring Report, accessed through https://www.adb.org/projects/51077-003/main

All these initiatives must be supplemented by continuing the awareness raising on source segregation & proper management of waste in the country. Current efforts included raising awareness among school children and parents through the education systems. Maldives National Skill Development Authority (MNSDA) is also currently providing a "Waste to Wealth" curriculum in order to develop the relevant knowledge and skills related to converting waste products collected at IWRMC into wealth. Further initiatives and campaigns such as "Fasgandu" are also implemented by MoECCT focusing on the public in general. "Fasgandu" is a national campaign recently launched by the ministry to improve the public awareness and community engagements towards sustainable waste and resource management in Maldives. The private sector, especially Civil Society Organizations (CSOs) working in the field engage in awareness raising activities throughout the country.

However, much work still needs to be done in order to maintain the current successful efforts to increase public awareness on the issue and to ensure the successful implementation and monitoring of such activities.

6.3. Waste prevention (reduction) and reuse

Waste prevention lies at the top of the waste management hierarchy, as the most efficient way to improve resource efficiency and to reduce the environmental impact of waste. The definition of 'prevention' has been a matter of some debate. The OECD defines waste prevention as:[14]

- ***Strict avoidance*** - the complete prevention of waste generation by virtual elimination of hazardous substances or by reducing material or energy intensity in production, consumption, and distribution.
- ***Reduction at source*** **-** minimising use of toxic or harmful substances and/or minimising material or energy consumption.
- ***Product re-use*** - the multiple use of a product in its original form, for its original purpose or for an alternative, with or without reconditioning.

It is important therefore that appropriate measures be taken to prevent waste generation and reduce the presence of hazardous substances in products, as well as monitor progress in the implementation of such measures. Such measures could include innovative business and consumption models that encourage the increase of the lifespan of products and that promote re-use, through the establishment and support of re-use and repair networks and return-refill schemes; also, by incentivising remanufacturing, refurbishment and, where appropriate, repurposing of products as well as sharing platforms.

Moreover, the increase in the share of reusable packaging placed on the market should be encouraged.

6.4. Establishment of an EPR system

It is emphasised that EPR is a highly valuable policy instrument to make Producers responsible for dealing with discarded products after their useful life. This instrument was initially applied for packaging material and after a successful implementation was extended to a range of other products. The implementation of EPR is

[14] OECD (2000) *Strategic Waste Prevention*: OECD Reference Manual, Paris

foreseen in a number of policy documents in Maldives, a fact that indicates the engagement of the Government to enforce it:

- Section 18 of the new Waste Management Act: an EPR Regulation will be enacted, in which candidate products (such as packaging, electric and electronic equipment, batteries and accumulators, lubricant oils, vehicles and tyres) will be decided and specified.
- Action 1.1h of the 2019 – 2023 Strategic Action Plan: Develop a framework for EPR or other product stewardship programmes
- Policy 4 of Single Use Plastics Phase Out Plan: Legislation on extended producer responsibility on Packaging
- Action 16.2 of National Waste Policy 2015: Formulate and approve a national implementation plan to establish the principle of extended producer responsibility

Central in this policy is the definition of the term "Producer", which is defined as: "any person in Maldives that, irrespective of the selling technique used, including by means of distance communication, places a product on the market for the first time within the territory of Maldives on a professional basis". In other words, a Producer can be either the manufacturer or the professional importer of a product to Maldives.

At present, possible options for implementation of EPR are being assessed. The EPR framework will define in a clear way the roles and the responsibilities of the various actors in this field, and indicatively:

Competent and regulating authorities: define measurable waste management targets; establish an adequate inspection, monitoring and enforcement framework; issue PRO permits/registration; establish a reporting system to gather data on the products placed on the Maldivian market by the producers subject to EPR; ensure a fair competition environment; Provide information to citizens and waste holders regarding the EPR schemes; create incentives for the waste holders, in order to take part in the separate collection.
Producers: limit the weight and volume of packaging to a minimum in order meet the required level of safety; reduce the content of hazardous substances and materials in the product/ packaging material; design reusable or recyclable product/packaging; ensure the separate collection, transport, recycling or environmentally safe disposal when the product becomes waste, either collectively through an association of producers Producer Responsibility Organization (PRO) or individually; pay the financial contribution to cover the cost of waste management of the products.

Producer Responsibility Organization: assume obligations on behalf of producer/(s) for the product under the EPR (separate collection, transport, recycling or environmentally safe disposal); use the financial contributions of producers to finance directly the collection and recycling of the products when they become waste and/ or finance the island councils for the amount collected and/ or establish "Take-back schemes" (i.e. take back their products from end users at the end of its useful life); puts in place an adequate self-control mechanism; makes publicly available the information.

The EPR schemes are in most countries run by so called Producer Responsibility Organizations (or "Compliance schemes") that are owned, as a rule, by the producers of the products in question, or few cases by the State. Therefore, there are two EPR Models possible for implementation:

a) A non-profit Producer Responsibility Organization (PRO) run by the Producers

b) A Centralised PRO run by the State

Knowledge on the number, type and quantities placed on the market by the producers of each EPR scheme is essential for its operation. Therefore, a central common reporting scheme needs to be developed at a central basis. This electronic Registry aims to organize and administer information, material and financial flows; it will also be a valuable tool to track "free-riders".

An EPR framework/ roadmap is currently being implemented, whereas all provisions above will be encompassed in the upcoming EPR Regulation.

6.5. Facilitate a regular and effective Capacity Building mechanism for competent authorities

The waste management legislation and other regulations such as the Decentralization Act are activating waste management system at local level by integrating infrastructures and practices, at local, regional and national levels. However, in practical terms, the legal acts face a poor implementation, since most of the islands lack financial resources. Income from waste collection fees does not cover expenditures to operate and maintain IWRMC. Councils have to rely on their own budgets to close the financial gaps.

Human resource and lack of technical knowledge are additional barriers faced by island councils to implement waste policy.

In regard to existing infrastructure, limited training of the technical personnel has led to underperformance of machinery, a challenge observed in few islands.

Chapter Three of the new Waste Management Act describes the responsibilities of central authorities in the Maldives, the main ones being: policy development, legislation, enforcement, licensing and monitoring.

Given the above barriers, it is imperative to provide technical and administrative Capacity Building to the Service Providers and the competent authorities involved, in order to provide the requested services and effectively perform their roles. This may entail on one side the strengthening of authorities with new personnel, qualified as necessary. Also, the performance will be improved with additional technical means such as IT equipment, trucks/ sea vessels, laboratory equipment and similar. Very important is the regular support of technical personnel to develop their skills, in priority areas/topics such as indicatively:

Public Procurement and contract management: a carefully planned procurement process with suitable technical specifications, performance guarantees, "green" award criteria, evaluation steps, claims, penalties, etc, will safeguard and deliver a sound project or service.

Operation and maintenance of IWRMC and other waste components: Manufacturers of mechanical equipment installed in the island centres, shall be requested to provide training to local staff. Moreover, manufacturers shall commit to allow for availability of spare parts in the Maldivian market for at least 10 years.

Basel convention on Transboundary Movements of Hazardous Wastes: Procedures for export of hazardous waste are governed by the Basel Convention, ratified by the Government. Customs and Notifying authority must be well aware of these procedures and be able to routinely work with the waste list/ codes and distinguish between wastes/ second hand goods.

Plastic pollution: Plastics has the potential to pollute the environment for many decades. There are international initiatives seeking for cooperation to end plastic waste pollution.

Food waste: Roughly one-third of the edible parts of food produced for human consumption, gets lost or wasted globally, which is about 1.3 billion ton per year. This is unacceptable from an ethical, environmental and economic point of view. United Nations have adopted a target of halving per capita food waste at the retail and consumer level, and many countries are seeking measures to this direction.

E-waste: According to the WEEE Forum, e-waste is the fastest growing waste stream in the world and therefore of global concern. Actions at national and international level are needed, so as to cover critical areas of e-waste management and EPR programmes.

Healthcare waste: the provisions set in the draft National Health Care Waste Management Guideline must be implemented. Especially, thorough training on the specific measures applied and the procedures for material segregation in coloured bags, must be envisaged for the medical personnel, as well as for the appointed competent responsible person.

Monitoring: the continuous monitoring and assessment of the proposed measures is a pre-requisite for the effective implementation of the Policy. It will be more practical to allocate the same staff for the National Database and for the monitoring purposes.

Monitoring can also include the environmental performance of the treatment facilities (air emissions from incinerators, etc).

6.6. Establish a sound working environment for special and hazardous waste treatment

Currently, a proper hazardous waste (HW) management system is missing in Maldives resulting in high risks to the environment and human health. There have been reports on complaints claiming groundwater contamination due to mismanagement of spent oil as well on incidents of air pollution due to unproper handling and disposal of hazardous wastes. Furthermore, inventories, composition and final destination of HW are to a large degree unknown, thus increasing the risk of mismanagement, releases and spills.

Diluted responsibilities and lack of distinct regulations has contributed to this situation, despite 2015 WM Policy requiring to accommodate specific provisions for special wastes. The Basel convention on the Control of Transboundary Movements of Hazardous Wastes has been ratified, as per the 2017 third amendment of the Waste Management Regulation. Practical implementation, though, is not in place since officially there are no exports of hazardous waste.

There is on-going work by MoECCT to clarify mandates and also to draft a regulation and procedures on HW sound management, including a Bill to address life cycle of chemicals. MoECCT is also in the planning process of implementing Regional hazardous waste management centers / storage facilities in Thilafushi and Addu City.

Overall, comprehensive policies and Standard Operating Procedures (SOP) to safely handle hazardous wastes need to be developed, such as for characterisation, labelling, testing, separate segregation, sea transport, processing and handling.

The new Regulation shall require annual reporting by the waste producers and the collection/ treatment companies. Also, a notice for waste transport (“Transfer Note” or “Manifest”) has to follow each batch of transferred HW throughout its life cycle, as shown in the figure below.

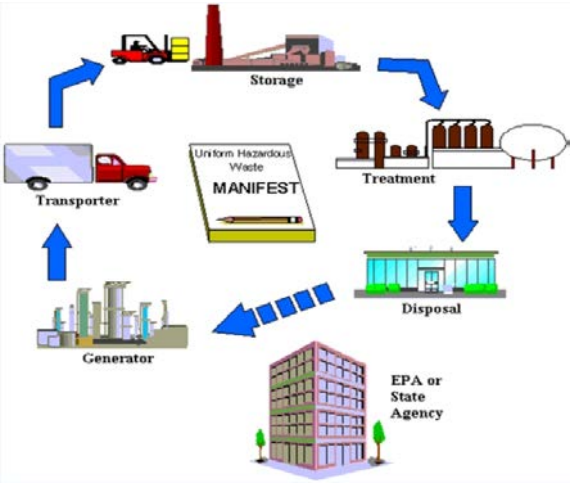


Figure 11: Pathway of Hazardous Wastes transfer route

Other recommendations from the specific technical assistance assignment on a safe functional HZ management framework regard:

- Establish an adequate collection system, either by private/governmental operated separate collection schemes and/or by establishing extended producer's responsibility schemes.
- Development of a cost recovery scheme (by waste fees/gate fees, state subsidies or others).
- Requirement for industries to test and maintain records of the quantities, types and characteristics of generated waste as well as on the disposal paths.
- Requirement for further institutional capacity building for management and monitoring

Furthermore, no HW framework can be effectively enforced without penalties threatened against the violators of the relevant legislation. The sanction threatened for the relevant offences, should be:

- effective
- proportionate
- dissuasive

As a last remark it is mentioned that in accordance to the "Polluter's Pay Principle", all special waste streams can be effectively handled through i) EPR schemes, ii) private sector involvement and iii) strong enforcement.

6.7. National Data and Information Registry (Database)

The National Bureau of Statistics has recently called for establishing a strong waste data system. It is proposed that a web-based IT information system is designed and developed, that will effectively monitor and report waste data from all sources. It is not possible to detail technical specifications, however the concept of the platform will be indicatively as follows:

- Registration of waste collection and IWMRC Operators (municipal and private companies)
- Registration of private companies active in collection & transportation of medical, hazardous, construction or other special waste

- Registration of waste producers (companies, industries, etc), above a certain threshold
- Registration of Regional facilities or other facilities handling waste
- Expansion to a separate Registry modul for producers that “put on the market” packaging material
- Entry of waste management licences
- Entry of inspections and penalties
- Entry of certified users and filling of data (waste generated, collected, transferred, etc) once a year or prior to a waste transfer load - “Transfer Note”
- Real-time Connection of the Registry with weigh scales/ weighbridges

The Platform shall be able to automatically generate aggregate data. The competent authority MoECCT will elaborate annual reports that will be afterwards shared with the National Bureau of Statistics.

6.8. Engagement of private sector in waste management

Both public and private sector can address solid waste management in Maldives and both options offer advantages and disadvantages. The private sector is a major player in waste management, in delivering solutions to waste management problems, as suppliers of facilities and equipment and as service providers. The most important merit of the private sector is the flexibility, the capital availability and the risk transfer from the public authority. A decision is usually taken based on the national policy approach and a case by case “Value-for-Money” assessment.

At present, waste collection in the islands is performed by the island councils or by WAMCO or by Stelco (both governmental companies). WAMCO also operates the Thilafushi dumpsite and the future Vandhoo WtE plant.

A model case regards the construction of the Greater Male Waste to Energy plant in Thilafushi, that is expected to generate 10 – 12 MW of electric power and will be operated by the Contractor for 15 years.

With the development of waste management in the country, there will opportunities for engagement of the private sector, that will allow to address many of the existing gaps. The following options are possible:

- Design-Build--Operate-Finance ("DBFO") of a waste facility: allows a private contractor (operator) to finance, design, build and operate the facilities. At the end of the contract, the operator hands over the facility to the public entity. This option is a common type of a Public Private Partnership (PPP).

  A large part of the project’s risks are transferred to the private sector.

  The payment is typically made on a mass basis, so as to cover Operator’s capital costs (CAPEX) and operating expenses (OPEX). The contract includes provisions guaranteeing the operator a minimum repayment enabling him to ensure the reimbursement of his financial expenses and part of his operating expenses. The contracting public entity undertakes to treat a minimum quantity of waste per year, or else to pay the amount for this minimum quantity.

- Design-Build-Operate ("DBO") of a waste facility: it entrusts a single operator with the detailed studies, construction and operation (as mentioned, this option was used for the Thilafushi WtE plant). The public entity raises the financing (through bank loans and/or grants) and conducts the preparatory

design studies that set the functional and performance requirements. It also retains ownership of the works.

The advantage of this option is that there is a single contracting procedure and a single responsibility for the three phases of design, construction and operation. The cost optimization covers all three activities. There is therefore an incentive for bidders to adopt design and construction that compress operating costs.

The investment costs are paid according to the progress during the construction period whereas the operation costs usually on mass basis (tonnes per day, typically with a minimum input threshold).

- Service contracts or concession agreements for the collection service of municipal waste and transportation to the Regional facility: in this option, the collection service is delegated from the public entity to the private sector under specific terms or performance requirements. The private sector may be responsible for supplying equipment such as vehicles, containers, etc. The payment method is related to the performance of the service (in other words amount of collected waste).

  The service may include only sea transfer of residual waste and materials to the Regional facility.

- Service contracts for the collection and transportation service of industrial, C&D, hazardous, hospital or waste from resorts/ hotels, and in general for any waste that is generated by private entities or institutions. The waste shall be transferred to authorized facilities only for treatment, holding a valid permit.

- Service contracts for the operation and maintenance of an existing or a future waste facility, that has been constructed by a different, third party. The service shall be undertaken under specified performance requirements

- Finally, there is always the possibility that a private party enters the market without an official procurement procedure, where a business opportunity is identified. Such cases may be for example a composting plant in islands with agricultural waste generation and especially the measures to comply with the obligations of the EPR scheme.

There is certain future infrastructure in planning phase, that can be constructed under the DBFO option in Maldives, namely the (Regional) Material Recycling facilities (or “Sorting plants”) and the Hazardous waste storage and pre-processing plants. It should be taken into account that DBFO arrangements are in general more complex to implement, and demand stronger support and commitment from the contracting authority. Another possible option would be the DBO type.

It is highlighted that under all the above possible options, the private sector has to be fully reimbursed according to contractual conditions. Failure in this regard will lead quickly to the (legitimate) withdrawal of the services offered. This requirement imposes a parallel requirement on the public sector entity to ensure an adequate cost recovery framework, including the definition and maintenance of a tariff structure and adequate mechanisms for cost recovery.

Currently, waste management in the islands is not financially viable since revenues do not cover expenditures. Moreover, willingness to pay is low. The tariffs are set on the basis of a flat rate: It consists of a fixed fee per household, business and or institution charged independently of the actually generated waste amount, i.e. it is charged as lump sum. This model does not provide for any incentive to reduce waste or to engage in source segregation. According to WAMCO, service charges are not sustainable and do not reflect reality.

In this respect, a Full-Cost Accounting (FCA) method must be implemented, i.e. a tool to identify, quantify and allocate the direct and indirect environmental costs of ongoing company operations. Full cost accounting helps identify and qualify the following four types of costs for a product, process or project: direct costs, hidden costs, contingent liability costs, and less tangible costs. Implementing Full-Cost-Accounting (FCA) will provide accurate costs of waste and resource management. FCA can be used to determine and analyse costs by activity and by waste stream and can include other functions important to any waste management program: community education and outreach, executive and oversight functions, and support services such as billing, maintenance, etc.

After the FCA method is implemented, the costs of waste management should be borne by those who generate waste, in accordance to the "Polluter-Pays-Principal". This will be made by establishing a tariff structure for the households and the commercial sector and by taking affordability and subsidies into account.

It is highlighted that the 2019 – 2023 Strategic Action Plan sets Action 1.3e: *Establish a feasible fee structures and fee collection methods at island level.*

6.9. Transition to Circular Economy

Circular economy (CE) is a key part of creating a sustainable green economy, and a big opportunity for Maldives to support initiatives for a successful transition.

The concept is new in Maldives and no major initiatives or actions have been recorded that promote the concept of circularity of resources (materials, goods, and services) in the economy cycle. Activities not explicitly related to "circular economy" are mainly associated with tackling marine litter and preventing ocean plastic pollution. Under MCEP and other programs funded by different IFIs, resource efficiency has been promoted through seminars, workshops, best case presentation, trainings etc. The most prominent campaigns have been "PlastikaaNulaa" (WithoutPlastic) and PROBLUE.

The transition to circular economy is a long process, given the complexity of initiatives and players involved throughout the design, production and consumption chain. It often depends on change of global patterns. That is why it remains a long term ambition.

The geographic remoteness of Maldives represents a barrier to the sourcing of raw materials. Another obstacle regards the limited industrial activities and the import of most goods to the Maldivian market. This means that there is limited influence to affect product design, durability and effective raw material usage. Nevertheless, the current SUP policy is a main breakthrough and a strong example of how national authorities can play a pivotal role, as well as to send market signals to embrace CE in the production phase.

Even though the lifetime of products can be extended through reuse and repair, it appears that in many cases the repair is more expensive than buying a new product, probably because of the small size and distance of the Maldivian market. Prolonged consumption is thus hindered.

Nevertheless, a proper waste management system that is in-line with the waste hierarchy, where thermal recovery of residual waste is also adopted as part of the overall system, fits adequately with the principles of CE. In this respect, the adopted options should be in the direction of higher levels of reduction/ reuse and recycling, where technically and financially feasible.

Work will concentrate on establishing EPR system for specific waste streams and continuing current recycling efforts, by diverting dry materials as clean as possible. The production of compost for land application, from separately collected green and biowaste, has a very high potential and is a challenge in Maldives.

Regarding the "waste to resources", focus will be given to food and green waste, plastics and electronics. Another barrier here is the absence of local market for secondary raw materials. It needs to be investigated how to optimize logistics and reduce the cost of shipping to continental areas.

Especially for food waste, roughly one-third of the edible parts of food produced for human consumption, about 1.3 billion ton per year, gets lost globally. Food absolutely fit for human consumption is wasted throughout the food supply chain, from agricultural production down to final consumption. United Nations has called Member States to "halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses by 2030,"; In order to measure losses, two sub-indices have been proposed: a Food Waste Index (FWI) and a Food Loss Index (FLI).

Even though there are quite few measures that can be undertaken to onset transition to CE, a detailed assessment and roadmap must be made in a dedicated study for Circular Economy and Waste prevention.

6.10. Required facilities for waste treatment

A Material Recycling Facility (or "Sorting Plant") is proposed for implementation in the medium term, within the Regional Facilities or in adjacent suitable areas. The plants will serve the task to sort and store the collected recyclables from the islands to different marketable fractions (PET, HDPE, other plastics, glass, paper, aluminium, tin, iron, etc). In these plants, suitable mechanical equipment will be installed, so as to achieve the best and optimum material purity. The facilities will be constructed through private initiatives. The suitable number of facilities to cover the entire region, will be determined from a feasibility study.

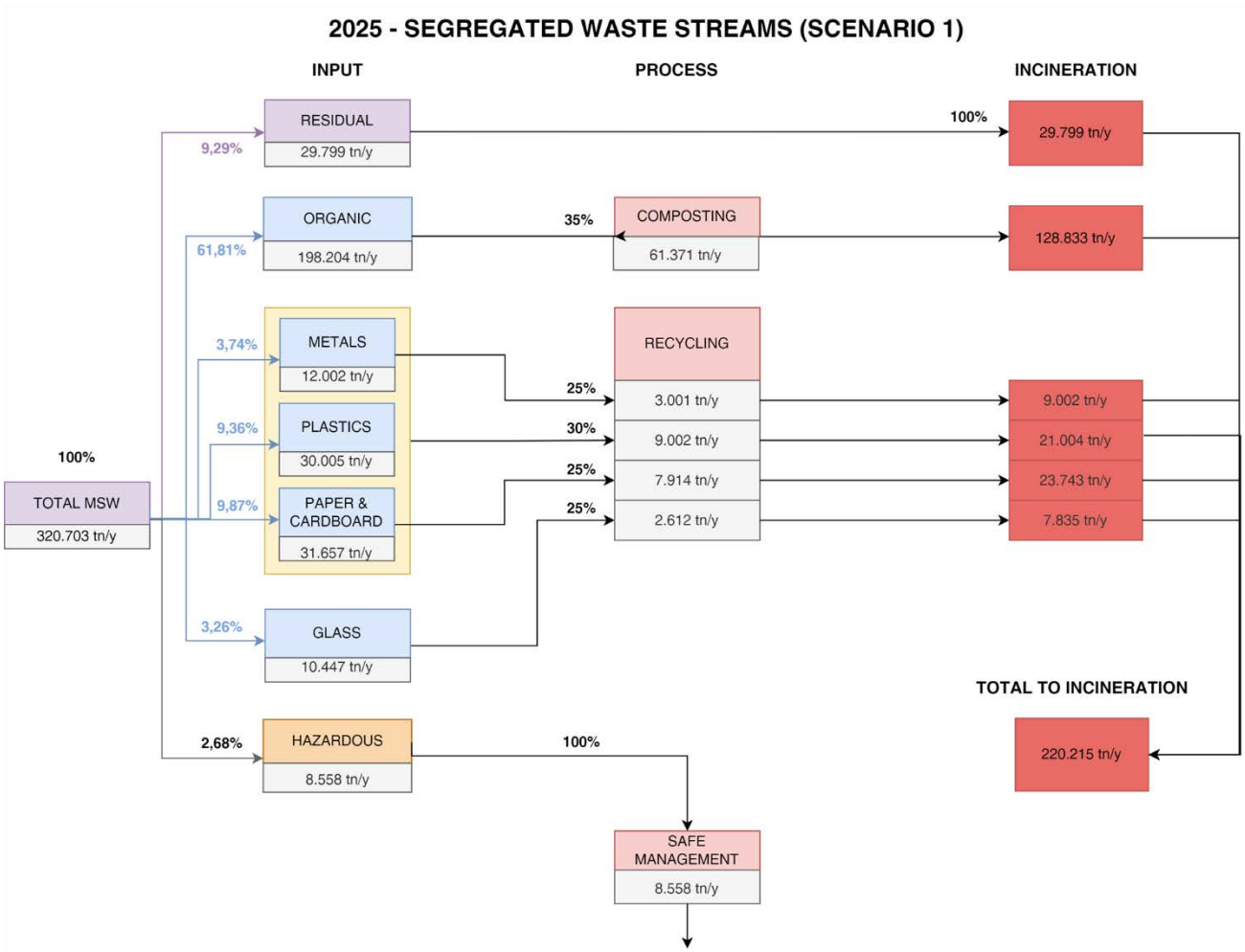
Also, two Regional hazardous waste management centers / storage facilities in Thilafushi and Addu City are already planned.

Several oil-storage tanks, solid waste containers and possibly one central processing facility will have to be installed for the ship (all types) generated waste.

The feasibility of establishing a central healthcare waste facility (high T incineration) must be assessed, considering that the autoclaves in the hospitals are not in operation, whereas for some types of waste incineration is the only possible route.

6.11. Municipal waste flow diagram

Considering the two scenarios of generated municipal waste future amounts (§ 4.3), the capacities of the regional facilities (Table 1) and the amounts diverted for recycling (§ 5.10), the flow diagrams for the two cases are shown in Figure 12.


2025 - SEGREGATED WASTE STREAMS (SCENARIO 1)
INPUT
PROCESS
INCINERATION
TOTAL MSW
320.703 tn/y
100%
RESIDUAL
29.799 tn/y
9,29%
100%
29.799 tn/y
ORGANIC
198.204 tn/y
61,81%
35%
COMPOSTING
61.371 tn/y
128.833 tn/y
METALS
12.002 tn/y
3,74%
PLASTICS
30.005 tn/y
9,36%
PAPER & CARDBOARD
31.657 tn/y
9,87%
RECYCLING
25%
3.001 tn/y
9.002 tn/y
30%
9.002 tn/y
21.004 tn/y
25%
7.914 tn/y
23.743 tn/y
25%
2.612 tn/y
7.835 tn/y
GLASS
10.447 tn/y
3,26%
TOTAL TO INCINERATION
220.215 tn/y
HAZARDOUS
8.558 tn/y
2,68%
100%
SAFE MANAGEMENT
8.558 tn/y

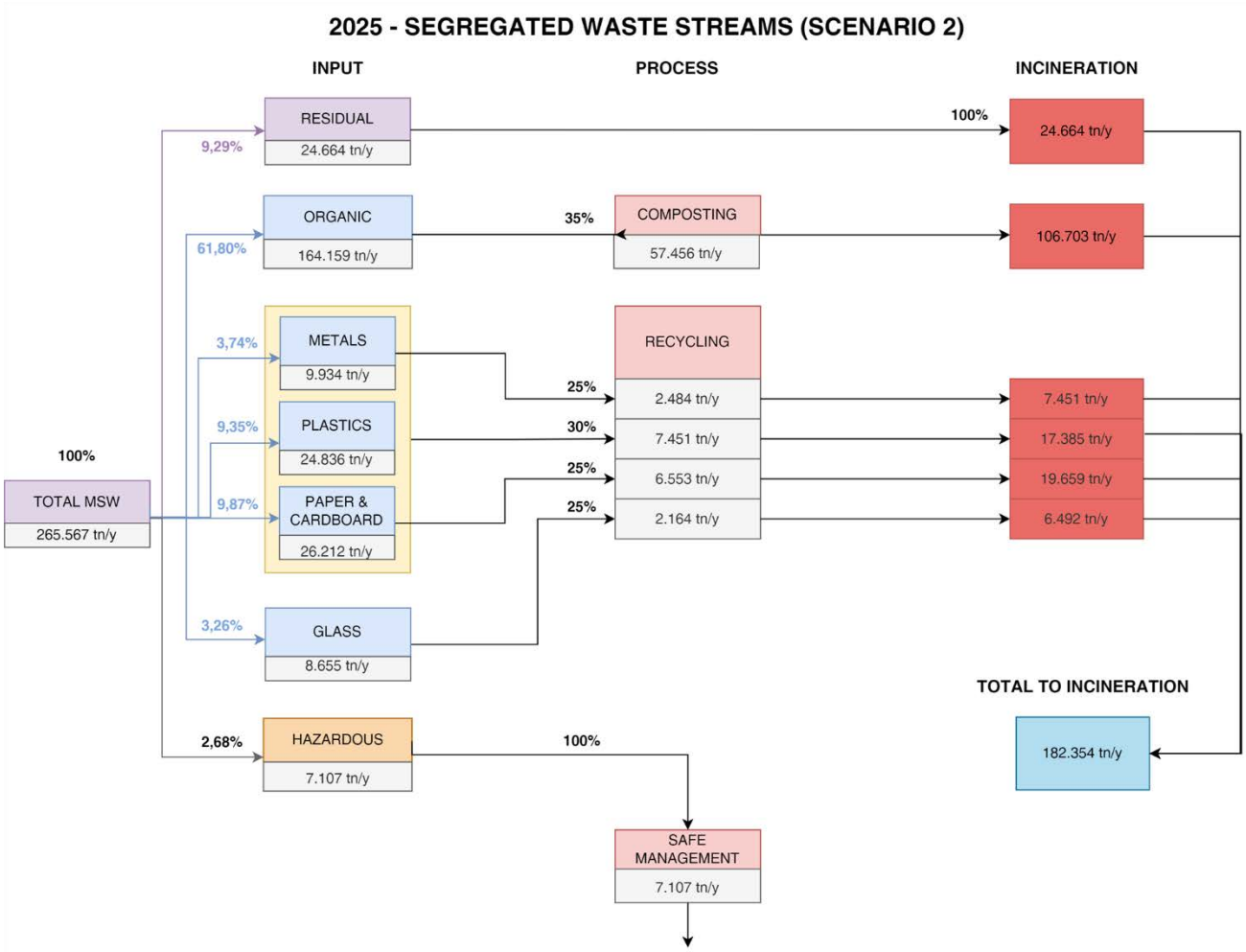


Figure 12: Waste flow diagrams for two scenarios - 2025

7. MEASURES TO IMPLEMENT THE GOALS

The present chapter exemplifies the particular measures to implement the goals of the 2023-2027 Policy.

7.1. Measures to implement Goal 1: Develop and enforce secondary regulations, standards, guidelines and plans

Table 11: Goal 1 Develop and enforce secondary regulations, standards, guidelines and plans

No.	Measure	Description	Responsible Body	Indicator	Timeline
1.1	Develop new regulations as set in the Waste management Act	1. Regulation on waste transport 2. Regulation on testing and certification of waste management equipment 3. Regulation on creating operational plans 4. Regulation on plastic bag levy 5. Regulation on management of industrial waste (including tourism industry) 6. Regulation on management of waste generated on air and sea transport 7. Regulation on exporting hazardous waste 8. Regulation on hazardous waste accidents and actions 9. Regulation on preparation, collection and management of Waste statistics 10. Regulation on penalties	MoECCT	Number of new regulations	2023

1.2	Develop new standards and guidelines for effective waste management	1. Standards for waste management service; 2. Guidelines for the tariff setting and the implementation of Full Cost Recovery system; 3. Guidelines for the recording, monitoring and reporting of waste data; 4. Guideline on provision of duty exemption for waste management related imports	URA (#1 to 3) MoECCT (#4)	Number of new standards and guidelines	2023 - 2024
1.3	Develop Island and Regional Waste & Resource Management Plans	1. Regional Plans and Feasibility studies have been developed for all Zones, except for Zones 4 and 5 that is on-going. New / Revised Regional Plans will be undertaken by MoECCT. 2. A number of Island Waste Management Plans have been submitted and approved by EPA, however they can be regarded now as obsolete and without plausible data. Local Plans are highly important to engage Councils and communities to a sustainable waste management. The Plans must be developed and/or revised and be in-line with the upcoming regulation and the National Policy objectives. The Plans have to include waste characteristics and audit. They have to document current and anticipated costs, and a transparent tariff setting that will recover the incurred cost.	MoECCT Island Councils	Number of Plans prepared and approved	2023 - 2024
1.4	Develop National Recycling Strategy, explore markets for recycling and establish synergies	In order to strengthen the Recycling sector and prepare entrepreneurs for the business opportunities, a National Recycling Strategy (with Feasibility Study) for metals, glass, plastics and other recyclables must be developed. The Strategy will also aim to identify and strengthen the local market for recyclables and compost. Suitable international markets will be also identified (India, Sri Lanka, Taiwan, etc). The Strategy will propose quality criteria for clean compost as well as for other materials, if necessary.	MoECCT Private sector	National Strategy prepared and approved	2023 - 2024
1.5	Elaboration of the update of Marine Litter Action Plan	The existing Marine Litter Action Plan elaborated by EPA expires in end 2022. The new Plan will be set for the next 5 years.	MoECCT	AP developed and approved	2023

7.2. Measures to implement Goal 2: Strengthen the decentralized waste management model by completing the infrastructure on island and regional level

Table 12: Goal 2 Strengthen the decentralized waste management model by completing the infrastructure on island and regional level

No.	Measure	Description	Responsible Body	Indicator	Timeline
2.1	Construction of new Island Waste & Resource Management Centers	As of today, 118 Island Waste & Resource Management Centers have been constructed and are operational in Maldives. The remaining 69 IWMRC will be established by the Island Councils and facilitated (financially and technically) by MoECCT.	Island Councils MoECCT IFIs	Number of new IWMRC	2023-2025
2.2	Supply of new vehicles, bins, equipment and sea vessels to enhance segregated collection	In order for an island council to effectively serve the local citizens and for the IWRMC to be fully functional, waste bins and a number of mobile and mechanical equipment must be purchased. Routine maintenance must not be compromised. The exact needed machinery can be identified in the Island WM Plans based on the generated waste amounts.	MoECCT	Number of islands and IWMRC supplied with equipment	2023-2025
2.3	Construction of Waste Recycling Plant	The Waste Recycling Plant(s) will serve the recycling needs of the whole Maldives, where the number and viability of plant(s) will be identified under Measure 1.4. Useful materials transferred from the islands will be sorted (even if materials are pre-sorted in IWMRC, a manual control and processing must be made to comply with the specifications of the recyclers) and temporarily stored prior to utilisation or export.	Private sector	t material recycled/y	2023-2026
2.4	Conduct a technical study on optimization of collection service	The study will define/ propose the configuration of the collection system, the number of collection points and the needs for inhabited islands in Zone or Atoll level.	Private sector WAMCO URA	Technical studies prepared	2023-2024

7.3. Measures to implement Goal 3: Ensure effective collection and local treatment of organic waste

Table 13: Goal 3 Ensure effective collection and local treatment of organic waste

No.	Measure	Description	Responsible Body	Indicator	Timeline
3.1	Enhance and strengthen the source segregation for organic waste	The source segregation of kitchen leftovers and green waste will be enhanced by allocating compostable bags, kitchen bins (caddies), or special bins for parks/ hotels/ markets/ restaurants/ other generators. Supply of home composting bins to selected households for garden use, along with clear operating instructions, is a voluntary option.	Island Councils MoECCT	Number of awareness sessions % segregated waste collected	2023-2025
3.2	Establish decentralized composting plants and supply with necessary equipment	In order to strengthen the decentralized model and handle the organic waste locally (island or Atoll level), functional aerobic or anaerobic (if size is appropriate) plants will be established. Both open composting plants and mechanical composters are suitable.	Island Councils MoECCT	Number of plants established	2023-2025
3.3	Promote initiatives to reduce edible food losses at the retail and consumer levels	The initiatives are addressed to ready food meals or packaged good close to the expiry date and regard mainly food redistribution or donation or use for animal feed, as appropriate. The initiatives will be further explored under Measure 13.2	Citizens NGOs Private sector	Food losses index assessed	2023-2025
3.4	Establish pilot project for used cooking oil separate collection	The pilot project for used cooking oil separate collection aim to divert a difficult stream towards incineration or other type of recovery and also prevent spoiling of oils to the sewerage system (oils are not compatible with wastewater treatment)	Private sector Island/ Atoll councils	Number of pilot projects	2023-2025
3.5	Create a market for products generated through composting of organic waste	Promote initiatives such as pilot application of compost, cooperation with agri-associations, preparation of Good Practice Guide, quality specifications, etc	MoECCT Ministry of Agriculture	Number of initiatives	2023-2027

				Adoption of compost quality specifications	

7.4. Measures to implement Goal 4: Close and rehabilitate at least 50% of island dumpsites

Table 14: Goal 4 Close and rehabilitate at least 50% of island dumpsites

No.	Measure	Description	Responsible Body	Indicator	Timeline
4.1	Cease of open burning of waste in 100% of all inhabited islands dumpsites	Abolish the unacceptable practice of open burning of waste and implement sanctions and high fines for the responsible persons	Island Councils EPA URA	% of dumpsites without open burning	2023-2026
4.2	Closure and rehabilitation in 50% of all inhabited islands dumpsites (aiming to 100% in the long term)	All islands must be connected to the Regional facilities, as soon as these will be implemented. Afterwards, all dumpsites can be closed, fenced (no access will be allowed) and rehabilitated in accordance to the standards developed.	Island Councils MoECCT	% of dumpsites closed	2024-2027
4.3	Field survey – risk assessment study for environmental hotspots in Maldives	This Goal will be supplemented by a field survey – risk assessment and topographic study aiming to record environmental hotspots & dumpsites in Maldives, so as to identify appropriate technical measures for site rehabilitation and clean legacy of waste. Chemical analysis of soil samples will be made as required	MoECCT	Number of studies	2023

7.5. Measures to implement Goal 5: Implement the Single Use plastics phase-out plan and further reduce plastic waste

Table 15: Goal 5 Implement the Single Use plastics phase-out plan and further reduce plastic waste

No.	Measure	Description	Responsible Body	Indicator	Timeline
5.1	Monitor the efficiency of the Single Use Plastics Phase Out Plan 2020-2023 and elaborate the updated Plan 2024-2028	The Regulation for the Single-Use-Plastics Phaseout is pending. The Phase-out Plan for some products was granted an extension, beyond 2023. The efficiency of the Plan must be monitored as indicated, assessed and barriers identified. After the period expires, a new Plan will be set for the next 5 years and for items such as plastic film, rigid plastics, PVC, etc and introducing new levies, as appropriate.	MoECCT	Six policies in the AP implemented New AP developed and approved	2023-2024
5.2	Establishing cooperation with neighbouring countries on joint efforts to tackle plastic waste	Since plastic waste is a stream of global concern, cooperation with neighbouring countries is proposed on problems faced, common approach and exchange of best practices on plastics management.	MoECCT	Cooperation established	2023-2027
5.3	Voluntary agreements in the business sector to reduce plastic items and packaging	This measure includes initiatives to promote sustainable business models such as product eco-design, replace common everyday plastic items, distribution of multi-use carrier bags and multi-use water bottles, etc.	Private sector NGOs	Number of agreements	2023-2027
5.4	Establish Eco-Centers and support second-hand market	Eco-centers can be established as stand-alone, independent centers and not necessarily within an IWRMC. Their function is to receive various materials in a good or torn condition, and undertake reuse/repair/exchange/re-selling. Such materials can be electric and electronic equipment, textiles, toys, clothes, CDs and furniture. The Eco-centers must be kept clean, aesthetically pleasing and be appealing to local citizens.	Island Councils Atoll Councils	Number of Eco-Centers	2023-2027
5.5	Establish drinking water refilling stations in the islands	Desalination plants have been recently constructed in all islands. Even so, drinking from water bottles is a common practice in Maldives. By installing drinking water refilling stations in common	Island Councils Atoll Councils	Number of water refilling stations	2023-2027

	in order to reduce dependence on bottled water	areas, accessible to locals and visitors, bottled water consumption will be reduced.			
5.6	Participation in international Actions and Forum related to plastic waste	Action and progress is being made on plastics pollution, including microplastics, however global collaboration is needed. Example of Forums addressing plastic waste are: the UN Environment Assembly (UNEA-5) that agreed on a resolution to end plastic pollution and requests the convening of an intergovernmental negotiating committee; and the Basel Convention for control of transboundary movement of hazardous wastes that has recently adopted actions to address plastic waste.	MoECCT EPA	Number of personnel	2023-2027
5.7	Gradually abolish plastic bags and replace with paper/ compostable bags	This measure relates to substitution of plastic bags with paper or compostable alternatives	MoECCT Private sector	% reduction	2024-2027

7.6. Measures to implement Goal 6: Provide for Beaches and Public Areas cleaning

Table 16: Goal 6 Provide for Beaches and Public Areas cleaning

No.	Measure	Description	Responsible Body	Indicator	Timeline
6.1	Supply of easily accessible outdoor bins, "Anti-littering" signs and beach cleaning machines	The superb coastline of Maldives is a recreational area for its citizens and a major attraction l for thousands of tourists every year. The coastline is under continuous stress from island dumpsites and abandoned waste that is left on the beaches. This measure is also related to # 2.2 and aims on one hand to conveniently place bins and avoid littering in all public places and on the other hand to clean the areas with manual means, as desired and applicable.	Island Councils MoECCT	Equipment supplied	2023-2027

6.2	Implement public awareness "Anti-littering" actions in cooperation with NGOs	The public awareness "Anti-littering" actions will aim to sensitize public and highlight the antisocial behaviour of littering.	Island Councils NGOs	No of campaigns	2023-2027
6.3	Implement beaches and Public Areas clean-up actions, with public participation	Until now, clean-up of beaches/public areas is made mostly on a voluntarily basis, nevertheless there have been systematic actions in few islands. This measure aims to protect, restore and clean the beaches in all islands, in order to protect the marine ecosystem from waste leaking and improve the tourism opportunities.	Island Councils NGOs Public	No of clean-up actions Length of coast-line cleaned	2023-2027

7.7. Measures to implement Goal 7: Development of a National Data and Information Registry

Table 17: Goal 7 Development of a National Data and Information Registry

No.	Measure	Description	Responsible Body	Indicator	Timeline
7.1	Develop technical specifications for the National Data and Information Registry (Database)	The IT information system shall be designed to effectively monitor and report waste data from all sources and to cover the needs of waste producers and relevant authorities. The IT information system shall effectively track waste flows.	MoECCT NBS	technical specifications delivered	2023
7.2	Implement and operate the National Data and Information Registry. Training of personnel	As per design and the functionalities of the IT system, this shall have one body with a system administrator role, and various users that will be registered and periodically fill data. Personnel with an administrative role will be trained on the functions and modules of the system	MoECCT EPA Producers and Companies	National Data and Information Registry operational	2023-2024
7.3	Elaborate a national waste audit	A national waste audit of representative islands, resorts and industries will be conducted. The duration will be for a year and will arrive at an annual waste generation and an average national composition. It is	WAMCO Island Councils	Number of audits	2023-2025

		proposed that the waste audit is supervised by WAMCO. The audit will be repeated as appropriate.			

7.8. Measures to implement Goal 8: Design and implement an effective model for Extended Producers Responsibility (EPR) and Take-Back schemes

Table 18: Goal 8 Design and implement an effective model for Extended Producers Responsibility and Take-Back schemes

No.	Measure	Description	Responsible Body	Indicator	Timeline
8.1	Implement pilot packaging, e-waste and batteries separate collection and recycling projects in selected areas in Male and other islands	Pilot projects for products to be included under the EPR principle, must be undertaken by the private sector, in order to assess main parameters for the configuration of upcoming scheme, indicatively: public participation, incentives, cleanness and impurities of material, density of collection points, etc.	Private sector	No of pilots implemented and t material collected/y	2023-2025
8.2	Prepare the horizontal EPR framework for all products subject to EPR	The EPR framework is being prepared through independent assistance from two NGOs (Common Seas and Zero Waste Maldives). The details of the model suitable for Maldives shall be defined, but it shall be based on a private, non-profit PRO type.	MoECCT NGOs	EPR Framework approved	2023
8.3	Provide legal and technical assistance to MoECCT for ongoing support of EPR	In order to plan ahead for all accompanying actions, to tackle with the everyday questions from the obliged stakeholders and to ensure effective implementation of this new introduced Policy, a capacity	MoECCT	TA launched	2023-2027

	implementation through a TA project	building programme must be assigned to provide daily support to the competent authority			

7.9. Measures to implement Goal 9: Engage the private sector in waste management activities and establish procedures for more efficient involvement

Table 19: Goal 9 Engage the private sector in waste management activities and establish procedures for more efficient involvement

No.	Measure	Description	Responsible Body	Indicator	Timeline
9.1	Strengthening the public private partnership	The private sector should be encouraged to be involved in the waste sector, both in Services as well as in Works. "Value for money" assessment must be prior made. Participation of small& medium enterprizes has to be encouraged.	MoECCT	Two PPP cases are established	2023-2027
9.2	Private sector involved in the collection, transportation and handling of municipal as well as special (hazardous, C&D, etc) waste	The private sector is a major player in waste management, in delivering solutions to waste management problems, as suppliers of facilities and equipment and as service providers. With the development of waste management in the country, there will opportunities for engagement of the private sector, that will allow to address many of the existing gaps.	Private sector	Number of companies registered	2023-2027

9.3	Implementation of Full-Cost-Accounting in each island and in the regional waste management centers, and setting a fair tariff structure for service users	The FCA is a tool that identifies direct and other categories of cost of the waste management service. It assists the local authority to understand the categories that contribute more to the cost, assess the potential for improvement and make sound decisions. After the FCA system is set and gradually implemented, a fair tariff structure for the service users shall be promoted.	URA Island Councils WAMCO Service providers	FCA prepared and implemented	2023-2026
9.4	Obligation for every citizen to participate in the local waste collection service and tariffs	Service charges shall be collected from users through electricity bill or through property tax (based on sq. meters); a variable charging system could be considered	URA Island Councils	% population participation to WM services	2023-2025

7.10. Measures to implement Goal 10: Increase public awareness on waste management, and enhance human resources through training and capacity building

Table 20: Goal 10 Increase public awareness on waste management, and enhance human resources through training and capacity building

No.	Measure	Description	Responsible Body	Indicator	Timeline
10.1	Continue nationwide awareness campaigns and programs to raise awareness on proper waste management practice in all levels of the community and ensure successful implementation and monitoring of such programs	Capacity building and awareness raising efforts are integral to the success of a waste management system. Currently, there is a lot of effort on the raising awareness on segregation and proper management of waste in the country. Further initiatives and campaigns are also implemented by MoECCT. "Fasgandu" is a national campaign recently launched by the ministry to improve the public awareness and community engagements towards	MoECCT Atoll, Island and city Councils Ministry of Education, CSOs	Number of Campaigns Number of students and parents reached	2023-2025

		sustainable waste and resource management in Maldives. However, much work still needs to be done in order to maintain the current successful efforts to increase public awareness on the issue and to ensure the successful implementation and monitoring of such activities.			
10.2	Train and provide specific education to suitable candidates to develop waste management professionals with technical, specialized and certified knowledge.	The current mandate of waste management at island/city level falls on the jurisdiction of the island/city councils. However, at present, the personnel responsible for waste management in the councils are not equipped with technical knowledge and competencies required for proper management of waste. Hence, it is crucial that personnel involved in waste management in the councils and those who are interested in it receive technical and specialised training on the sector. Development of such short- and longer-term specialised training opportunities within the country itself can specially be beneficial in terms of financing, efficiency and overall development of the sector in the country.	Maldives National Skill Development Authority (MNSDA) MOHE	Number of certified / graduated professional staff	2023-2025
10.3	Identity national training needs in the sector and incorporate the needs into the National Training Needs List	As there is a serious lack of local professionals trained in the sector, it is important to identify and acknowledge the need for such expertise in the future labor pool of the country. The inclusion of the sector in the National Training Needs list will pave the way	MoECCT MNSDA MOHE	Trainings needs incorporated into the National	2023-2025

		for more education and trainings opportunities to those who are interested in exploring higher education opportunities and become professionals in the sector.		Training Needs List	
10.4	Provide specialized higher education and training opportunities for interested individuals on the waste management sector through different scholarships and higher education grants and loan schemes	Development of a pool of local professionals in the sector is critical to establish and sustain the proper functioning of the waste management system in the country.	MOHE	Number of certified / graduated personnel in the sector	2023-2025

7.11. Measures to implement Goal 11: Handle hazardous and other special waste in a safe manner

Table 21: Goal 11 Handle hazardous and other special waste in a safe manner

No.	Measure	Description	Responsible Body	Indicator	Timeline
11.1	Develop regulations and Standard Operating Procedures (SOP) on HW activities, such as for characterisation, labelling, testing, separate segregation, sea transport, processing and handling of hazardous waste	Recommendations are provided as per the dedicated Feasibility study for hazardous waste system in the Greater Male Region. It is noticed that such procedures on HW activities be thoroughly detailed during the EIA approval process and adequately monitored afterwards; procedures on HW activities must be part of the operating plan of any industrial plant.	MoECCT Private sector	Number of adopted SOP and regulations	2023-2024
11.2	Develop a reporting system and prepare annual reports on	The reporting system shall be part of the IT Registry (Goal 7). Annual reporting by the waste producers and the collection/ treatment	MoECCT Private sector	Annual reports developed	2023-2027

	collected, transported and stored HW by type	companies shall be required and based on these the competent authority shall publish annual reports. A notice for waste transport ("Transfer Note" or "Manifest"), as part of the reporting system, shall accompany each batch of transferred HW throughout its life cycle, for efficient tracking.			
11.3	Assess and expand EPR schemes for certain types of waste. Conduct environmental awareness on the EPR scheme	The EPR policy is considered-adopted for a range of special streams such as electronic equipment, lubricant oils, vehicles, tyres, batteries/ accumulators and any other necessary. Awareness for Importers / producers is also important for the success of such EPR schemes.	Private sector MoECCT	Number of schemes established	2023-2027
11.4	Construct, equip and operate HW storage facilities in Thilafushi and in Addu City	Recommendations as per the dedicated Feasibility study is for two HW management / Storage Centers. Stored waste will be periodically exported according to the Basel Convention.	Private sector MoECCT	2 storage facilities constructed	2023 - 2026
11.5	Provide collection bins / containers for specific waste types (batteries, e-waste, tyres etc.) in all Islands. Implement take-back arrangements	With the voluntarily cooperation of super markets, shops and island councils, bins shall be available for waste such as batteries, accumulators, e-waste and tyres. Take-back arrangements shall be made, such that a customer can give an old product when purchasing a new.	Private sector Island councils	Number of bins / containers provided Take-back arrangements established	2024-2027
11.6	Conduct a Feasibility Study for ship (MARPOL) waste on a national level	The objective of the FS will be to analyse the ports in the Maldives, estimate the marine waste quantities, create a deeper understanding of the MARPOL requirements on port reception facilities, solutions to avoid/ limit the various waste types discharged by the ships directly into the sea, apply a monitoring scheme in the ports of Maldives and establish a cost recovery scheme for users	EPA Port operators MoECCT	FS developed and approved	2023-2024
11.7	Evaluate synergies of incinerating high calorific value HW and industrial waste in WtE facilities	The construction of the Greater Male WtE plant will provide a possible safe disposal path for HW with a high calorific value, such as tyres and waste oils.	Private sector MoECCT	Quantities of HW accepted	2025 - 2027

11.8	Conduct a Feasibility Study for C&D waste on a national level. Promote collection and recycling of C&D waste by private operators	The objective of the FS will be to collect data and assess the status quo, make proposals for the improvement of the institutional framework for C&D waste, provide solutions and good practices for processing and recycling and propose technical specifications for secondary materials, as appropriate. In parallel, a network of authorized companies for C&D waste collection and recycling must be developed	Private sector MoECCT EPA	FS developed and approved % of recycled C&D waste	2023 - 2027
11.9	Adoption and implementation of the National Healthcare waste management guideline by all healthcare units	All provisions of the Guideline must be adhered: a waste management plan must be prepared, a focal point nominated, special colour bags for healthcare waste segregation be supplied and a suitable final treatment/ disposal point appointed. Capacity building for healthcare units personnel on waste management must be undertaken.	Health Protection Agency MoH Health-care units	Number of HC units adopting the Guideline Capacity Building delivered	2023-2027
11.10	Provide technical assistance and capacity building to the technical personnel of authorities and Service Providers	Because of the absence of a regulatory framework for HW management, it is important to provide adequate and repeated training and capacity building of the personnel involved in this sector. Training in the procedures of Basel Convention for transboundary shipment of waste is a priority.	EPA URA MoECCT Service Providers	Number of trainings Number of trained staff	2023 - 2025
11.11	Strengthen the enforcement and monitoring mechanism	Enforcement and monitoring are important for successful implementation of the legal framework, which is currently weak. Sufficient resources and tools to the enforcement authorities must be allocated. Sanctions must be posed to all law violators for waste crimes.	URA EPA	Number of controls & audits	2023 - 2027

7.12. Measures to implement Goal 12: Coordinate with tourism sector to adopt sustainable waste practices

Table 22: Goal 12 Coordinate with tourism sector to adopt sustainable waste practices

No.	Measure	Description	Responsible Body	Indicator	Timeline
12.1	Implement and receive a national or international environmental certificate (ISO, Ecolabel, or similar)	There is a significant potential to adopt green initiatives in the tourism sector towards waste reduction. It is evidenced that applying a voluntary Environmental Management System, such as ISO 14001 or similar contributes to optimum use of resources and waste reduction. Certification of small or bigger tourism enterprises is a procedure not entailing excessive cost and can be made with the aid of consultants. Periodical internal and external audits are made.	Private sector	No of hotels/ resorts certified	2023-2027
12.2	Replace plastic goods in the resorts with eco-friendly materials	Many plastic goods are already covered in the SUP Plan, but not all. Plastic disposable products can be replaced before the Plan's deadline.	Private sector	Number of hotels with plastics replaced	2023-2027
12.3	Organise food re-distribution/ donation of meals not consumed. Undertake Self-monitoring on food losses and reporting	Donation entails the highest environmental benefit with a strong social character since it helps to mitigate hunger and malnutrition. It has been revealed by literature that, surplus food discarded is in most cases absolutely safe and health to be consumed. All product groups (e.g. fresh fruits and vegetables, canned food and frozen food) can be donated. The potential to recover and redistribute edible food for people in need has not been exploited in the tourism sector. A cooperation with charity organisation will provide added value. External advice from HACCP quality experts will be beneficial. It has been demonstrated that recording of flows and waste production is a procedure that contributes to food waste reduction. The significance of food waste prevention in monetary terms has not	Private sector	Number of enterprises participating in food donations Number of enterprises undertaking Self-monitoring	2023-2027

		been fully realized, probably because of the yet low associated cost in Maldives. A survey must be carefully planned depending on the particular characteristics with the aid of a layout of the facility and conducted over a given time. Normally, useful "patterns" are revealed, for example food types more susceptible to wastage, recipes less popular, amount of waste after big events (marriages), monetary value of food thrown away. In this way, one can identify "hotspots" and rectification measures proposed.			
12.4	Produce clean compost from organic waste in the resorts	When prevention and re-use is not possible, composting of kitchen/ green waste or anaerobic digestion with conversion to biogas should be preferred over landfilling or energy recovery. Clean compost should be given to farmers.	Private sector	% resorts that treat organic waste on site	2023-2027

7.13. Measures to implement Goal 13: Promoting Waste Prevention and Transitioning to Circular Economy

Table 23: Goal 13 Prioritize waste prevention and Transitioning to Circular Economy

No.	Measure	Description	Responsible Body	Indicator	Timeline
13.1	Develop National Waste Reduction Plan and Circular Economy Roadmap to promote reduction (prevention) actions	The National Waste Reduction Plan for Maldives is important step to apply in practice waste hierarchy. The Plan is suggested to investigate the current situation in relation to waste reduction, highlight the current prevention best practices, define the framework and the waste streams of interest and propose measures, responsibilities and a roadmap of implementation. In parallel public authorities and private enterprizes (especially hotels and food serving companies) must prioritize activities for reduction in the field of their operations.	MOECCT public and private stakeholders	National Reduction Plan prepared and approved	2023-2027

13.2	Assess Food Waste Generation and Prepare Roadmap for Reduction in line with SDG Goal 12.3	Initially, a survey should take place nationwide to assess food waste generation. A methodological approach has to be developed in accordance with international standards (e.g. FAO) to assess food waste generation in the primary production, processing and manufacturing, tourism sector, wholesale and retail trade, food services and households. Then a roadmap for the reduction of food waste will be developed, in order to suggest sector specific measures, proposing good practices and describing a monitoring and assessment mechanism.	MoECCT Chamber of Commerce	Food waste assessment Preparation of roadmap	2023-2027
13.3	Reduce hazardous and noxious compounds in various selected products	Products of everyday use such as electric/ electronic equipment, batteries, cars, even packaging may contain hazardous substances such as mercury, cadmium, lead and other metals. These compounds are released to the environment after the useful life or endanger the recyclability of waste. Therefore, limit values of certain compounds in product categories need to be established through a Act or Regulation.	President Office Chamber of Commerce	Specific Act or Regulation on content limit prepared and adopted	2023-2027
13.4	Develop a voluntary Code of Good Conduct to implement the “right to repair” of electronics and ICT products	This measure is especially addressed to electric/ electronic equipment as well as mobile phones. Importers have to commit to provide a network of maintenance centers and spare parts for at least 10 years. The minimum guarantee period will be 2 years. For electronics and ICT the right to repair includes a right to update obsolete software.	Private sector Chamber of Commerce	Code of Good Conduct prepared	2023-2027
13.5	Establish Eco-Centers and support second-hand market	This is the same measure as #5.5. Eco-centers will undertake reuse/repair of various materials (electric and electronic equipment, textiles, clothes, toys, CDs and furniture) in a good or torn condition and eventually re-sell or exchange.	Island Councils Atoll Councils	Number of Eco-Centers	2023-2027

13.6	Engage producers and importers to promote packaging eco-design	This measure has the purpose to adopt eco-design in packaging products, and in particular: switching from non-recyclable to recyclable plastics, applying single plastic monomers, abolish colourants or problematic additives, replace virgin with recycled materials, promote biobased polymers, etc. Similar measures are already implemented in the Maldives.	Private sector	Number of products adopting eco-design	2023-2027
13.6	Assess and implement measures such as motives, economic instruments, digital tools, information systems, guidelines and standards	Measures such as motives, economic instruments, digital tools, information systems, guidelines and standards provide opportunities for all sectors to be engaged and exchange views on the Circular Economy.	Public and Private stakeholders	Number of measures implemented	2023-2027

7.14. Main quantitative targets

According to the 5th Amendment (2021) of the Waste Management Regulation, waste shall be segregated at source to a minimum of 4 different streams: 1) Food and other biodegradable (green, etc) waste, 2) plastic bottles and other plastics, 3) metals, glass and other Recyclables, as well as 4) Residual waste. There are many good practices on source segregation implemented in islands of Maldives, through which recovery of clean compost and useful material could be well documented. Especially, composting of organic waste is a natural process that is practiced globally for either low or medium/ large quantities and does not entail a high cost. Local composting will lower the sea transport costs and will also have a beneficial impact to the Incineration plants, as the calorific value will increase. The commitment of the local citizens and the Councils will be a pre-condition to meet the targets. Further, Policy 3 of SUP regards the Setting Reduction targets for plastic packaging.

The present Policy sets quantitative targets for separate collection and recycling which are realistic and achievable and will be reviewed towards the end of the planning period. Organics and material recycling, accompanied by incineration in the Regional facilities, will effectively promote waste reduction and minimise the need for landfill space.

The quantitative targets set in the Policy, to be achieved by the end of 2027, are as below:

- Achieve separate collection and composting of 35% by weight of organic waste generated
- Achieve separate collection and recycling of 30% by weight of plastic waste generated
- Achieve separate collection and recycling of 25% by weight of other recyclable materials (metals, paper, glass, etc) generated

In regard to the treatment of residual waste:

- 100% of residual waste from the 7 Zones shall be transferred to the respective Regional facilities for incineration by the end of 2027

In regard to the other special streams of importance:

- Achieve separate collection of 50% by weight of e-waste generated by the end of 2027
- Achieve separate collection of 90% by weight of waste tyres by the end of 2027
- Achieve separate collection of 80% by weight of ELVs by the end of 2027
- Achieve separate collection of 80% by weight of waste lubricant oils by the end of 2027

8. PROSPECTS AND DEVELOPMENT OPPORTUNITIES FROM THE POLICY IMPLEMENTATION

The current waste management model does not take into account the "hidden" externalities, such as greenhouse gas emissions, protection of public health, soil and sea pollution and, most important, the loss of resources. The new Policy for waste and resources management contributes to "Blue economy" and in this frame, prospects and development opportunities arise from the Policy implementation. These are outlined in the present sections.

8.1. Jobs Creation

The new Policy will contribute to jobs creation, direct and indirect, in Male and in the islands. Some of the new jobs will require technical skills, others more academic qualifications. These will be created in the following main areas:

Central implementation authorities: the competent authorities (such as Waste Department, URA, EPA) have new responsibilities that stem from the Waste Management Act. The Act also envisages the enactment of important regulations, therefore dedicated legal support will be needed. Moreover, a new "unit" or similar is required that will monitor the implementation of the Policy, supervise the actions, will routinely update the statistics in the Database and prepare the annual reports.

Construction of new infrastructure: the construction of the planned facilities (indicatively in § 5.11) will necessitate engineers, technicians and workers. There will also be permanent positions for the operation of these facilities.

Collection & transportation and operation of IWRMC in the islands: the collection, transportation and IWRMC operation in the islands will be better organised and structured. The activities will be implemented by the island councils and can be delegated to a private company.

Extended Producers Responsibility: the EPR policy instrument aims to make Producers/ importers responsible for dealing with discarded products after their useful life. The establishment of EPR entails the creation of a collection/take-back network, as well as information, administration and monitoring activities. It is mentioned that a National EPR Steering Committee will be also formulated, with the widest possible representation from involved stakeholders.

Education and awareness: This activity entails public education and awareness for sound source segregation, waste management and circular economy.

Use of secondary materials: this regards for example the establishment of a network for the market development, quality assurance and utilisation/purchase of the secondary materials, that will be created from the recycling activities in the Maldives.

8.2. Revenues

The associated costs from the Policy implementation will be partially counterbalanced by revenues. These will be:

1. Sale of recycled materials: Collected waste will be sorted, compacted, and sold as recycled materials such as paper, plastics, and metals. At present, PET and HDPE have a relatively high value in the international market.
2. Energy generation from waste: electricity is generated from waste incineration and exported to the grid. This electricity is partially renewable and can also benefit from carbon credits in the carbon market.
3. Compost production: Organic waste (kitchen leftovers, garden waste, etc) can be stabilised via the composting process to a fertilizer-type product, which in the beginning will be given for free to farmers and gardeners. Following a given period, where the product will be regularly tested, it can be sold at a small price.

Indirect revenues can be generated from the tourism chapter, as the implementation of sustainable practices and the cleaner public spaces will advertise the unique Maldivian environment and attract more tourists.

8.3. Sources of Funding

Possible sources of funding of the NWMPS (other than in § 6.2) are the following:

Waste tariffs: at present, tariffs for waste management are not adequate since revenues do not cover expenditures. Moreover, willingness to pay is low. Tariffs are set by the island councils and do not yet cover the final disposal costs in the Regional facilities. It is presumed, that a full cost recovery of the services cannot be achieved within the next years, thus costs have to be partially covered via subsidies.

Green Fund: a Green Fund from taxes already exists in the Maldives and funds can be directed to either waste, water, wastewater and environment preservation sectors.

Private sector funding: The private sector can easier invest in waste and resource management or attract capitals from Banks. Necessary projects or required services can be implemented through public-private partnerships.

International Financing Institutions (IFIs): IFIs, such as the World Bank, Asian Development Bank, etc, can provide grants or loans for waste management and resource management projects.

Extended Producers Responsibility: under the EPR policy, the product's future recycling costs are internalised in the price via the so-called "Advance Recycling Fee". Therefore, the Polluter Pays principle becomes Consumer Pays principle.

Government subsidies: The government of Maldives directly provides subsidies for waste management and resource management initiatives through budget allocations or grants.

9. MONITORING AND ASSESSMENT OF NWMPS IMPLEMENTATION

The continuous monitoring of all measures is a pre-requisite to assess the implementation of the NWMPS, identify possible shortcomings and elaborate future recommendations. Taking into consideration that the NWMPS requires the achievement of quite ambitious goals and targets within 5 years horizon, a key factor for success is the monitoring mechanism for the specific progress and shall include:

- ✓ systematic collection and management of information (statistical data), in terms of goals and measures, as well as in terms of achieving the objectives according to the schedule (timeline)
- ✓ evaluation of the course for implementation of the goals and measures to achieve the goals and
- ✓ ensure taking corrective measures on time, in order to achieve the targets, as appropriate

The continuous and consistent monitoring - evaluation of the National Waste Management Policy will be done through the monitoring indicators.

For each of the measures above, a suitable quantifiable index was assigned. It is highlighted, that since baseline data is missing for some indicators, the elaboration of a national waste audit (Measure 7.3) has to be by priority implemented.

Monitoring of the indicators will also help the authorities to identify in advance, delays and obstacles in the implementation process, any deviations from the objectives, and to evaluate the efficiency of the measures. The operation of the monitoring mechanism of the NWMP will have indicatively and non-restrictively, the following characteristics:

- Design and implementation of procedures (if possible, through an electronic registry) for exchange of information, verification of data and volumes etc. with all authorities involved in waste and resource management
- Interconnection of the registry in national, Atoll and island level, as well as private sector where relevant
- Periodical update of information
- Evaluation of the implementation course of the measures and especially of Works contracts for waste facilities
- Monitoring of waste exports
- Monitoring of data especially related to specific waste streams or products subject to EPR or SUP phase out plan

Competent authority for the monitoring of NWMPS will be the Waste Department of MoECCT.

MoECCT will compile data from the Registry, as necessary, and will develop annual progress reports, that can indicatively include:

- ✓ Assessment of past and current recycling, composting, and energy recovery rates in national, Atoll and island level
- ✓ Number of closed dumpsites and hotspots

- ✓ Evaluation of the achievement of the quantitative targets
- ✓ An estimation of a possible time extension needed to achieve targets
- ✓ Revised timeplan for the implementation of the above measures
- ✓ Changes to the competent authorities or other organizations, responsible for implementation