

A Circular Economy and Marine Litter Strategy for Maldives



<u>C. Tsompanidis</u>, T. Lolos, G. Tavoularis, A. Sakalis, M. Tsakona

21st June 2023

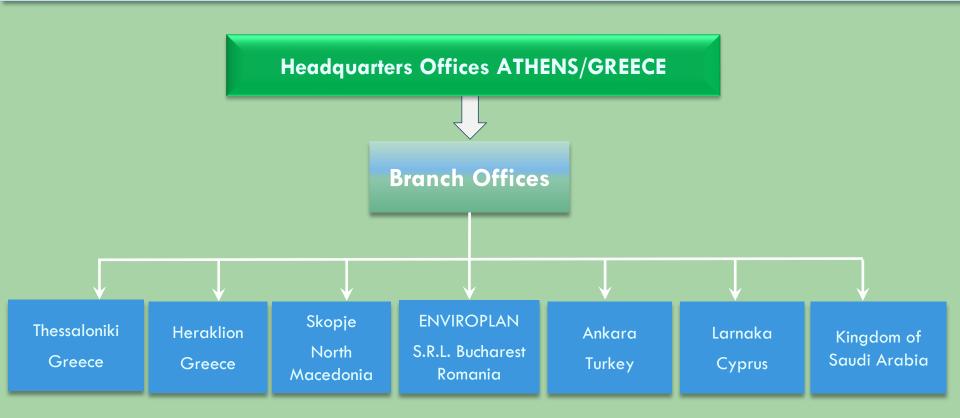






ENVIROPLAN Consultants & Engineers S.A.

Private Consulting Firm, founded in Athens in 1990



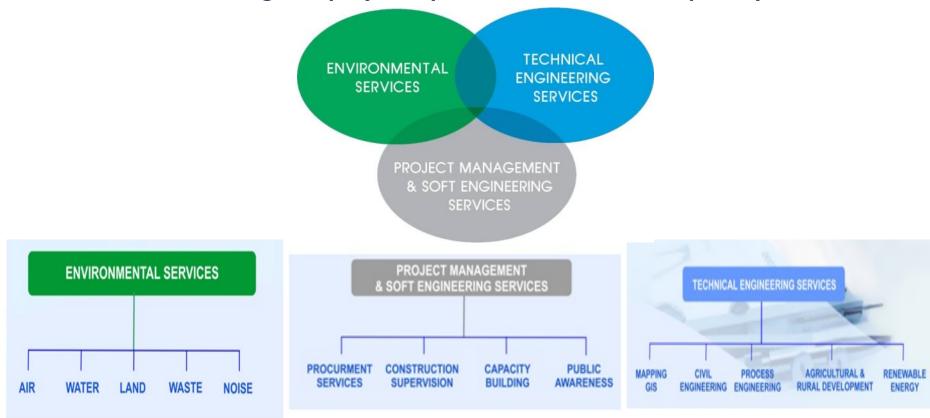


ENVIROPLAN A.E. Is certified according to EN ISO 9001:2015, EN ISO 14001:2015, EN ISO 45001:2018 and EN ISO 27001:2013 and holds also a permanent professional Indemnity Insurance Contract with XL Insurance Company SE (AXA XL Group).





ENVIROPLAN S.A. offers a broad range of services from the initial concept through to the commissioning of a project, specialized in multi-disciplinary solutions.



ENVIROPLAN S.A. has over 30 years of experience and expertise in Waste Management projects, providing consultancy and technical engineering services.





ENVIROPLAN S.A. is involved in many international environmental projects in:

✓ Italy

✓ Bulgaria

✓ Ukraine

✓ Egypt

✓ Cyprus

- ✓ North Macedonia
- ✓ Kyrgyz Republic
- ✓ Palestine

✓ Turkey

✓ Georgia

✓ Jordan

✓ Montenegro

✓ Romania

✓ Azerbaijan

✓ Lebanon

✓ Maldives

✓ Croatia

✓ Armenia

✓ Lithuania

✓ Albania

✓ Serbia

✓ Malta

✓ Uzbekistan

ENVIROPLAN S.A. has as clients many international organizations as well as governmental bodies such as:

- ✓ World Bank (WB)
- ✓ European Investment Bank (EIB)
- ✓ European Bank for Reconstruction and Development (EBRD)
- ✓ Joint Assistance to Support Projects in European Regions (JASPERS)

- ✓ KfW Development Bank
- ✓ Agence Française de Développement (AFD)
- ✓ Ministries
- ✓ Waste Management Organizations
- ✓ Local Authorities
- ✓ Private sector





The new National Waste Management Policy and Strategy (NWMPS) 2023-2027 is a policy instrument for the sustainable solid waste management in 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.

The study was elaborated in the context of the project: "Consultancy Assignment for the Revision of National Waste Management Policy and Preparation of a National Waste Management Strategy (MV-MEE-160547-CS-CQS)", financed under the Maldives Clean Environment Project (MCEP) and implemented by the Consortium:

- **ENVIROPLAN Consultants and Engineers S.A. (Greece) (Leader)**
- **CONCEPT International (Tunisia)** (Partner)
- **RIYAN Private Limited (Maldives)** (Partner)





Contracting Authority: Ministry of Environment, Climate Change and Technology / Republic of Maldives

Origin of Funding: World Bank / International Development Association

Duration: March 16th 2022 – February 13rd 2023







Scope of the Project

The Consultancy Assignment was elaborated through five (5) Tasks with the respective Deliverables covering the following:

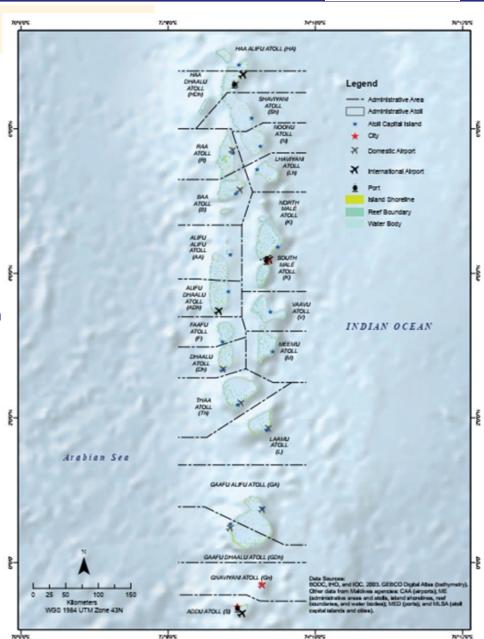
- ✓ **Deliverable 1**: Inception Report and Work Plan with Detailed Methodology
- ✓ **Deliverable 2**: Report on the Existing Situation and Stakeholder Consultations
- ✓ **Deliverable 3**: National Waste and Resource Management Policy
- ✓ **Deliverable 4**: National Strategy and Implementation Plan
- ✓ **Deliverable 5**: Review of the Waste and Resource Management Bill





Geography

- 1,192 islands
- Grouped in Atolls
- For administrative purposes, the Maldivian government has organized these Atolls into 21 administrative subdivisions
- Cover a geographic area of approximately 298 km², and is one of the most geographically dispersed sovereign states in the world, as well as the smallest Asian country by land area
- The islands vary in shape from small sand patches with sparse vegetation in the center to elongated strips and relatively circular islands with heavy vegetation cover
- Located near the equator with many monsoons occurring
- There are two distinct seasons, dry season (Northeast Monsoon) and wet season (Southwest Monsoon)

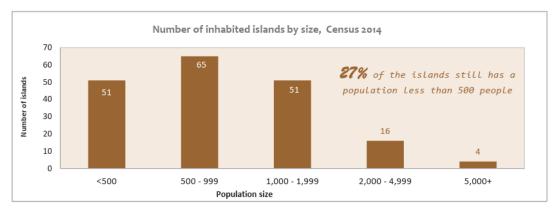






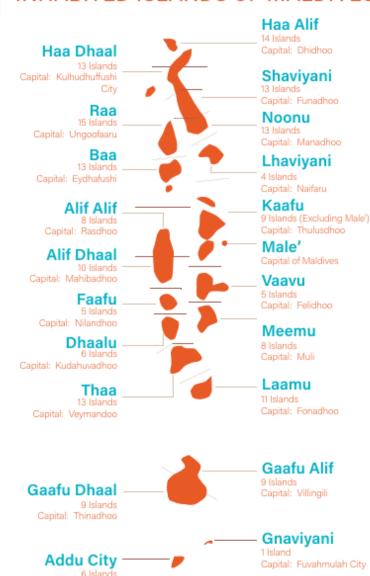
Population

- Total official population (last census 2014) 407,660 inhabitants of which: 338,434 permanent population, 63,637 foreigners and 5,589 Maldivians living abroad
- From the provisional results of the 2022 census, permanent population 515,122 of which 382,751 Maldivians and 132,371 foreigners
- Inhabited islands: 187
- Non-inhabited islands: 846
- Resort islands (2022): **159** (private islands, not included in the inhabited)





INHABITED ISLANDS OF MALDIVES

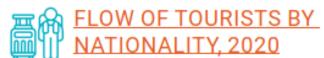


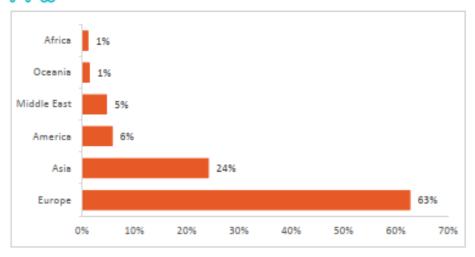
Capital: Hithadhoo



Tourism

- Tourist bed-nights (2019): 10,688,000
- Tourist bed-nights (2020): 3,985,000
- Tourist bed-nights (2021): 11,000,000 (approx. 30,000 equiv. inhab.)
- Contribution of tourism to the GDP: 26.3% (2019), 14.8% (2020) and 26.1% (2021)





NUMBER OF ESTABLISHMENTS, 2020

	Registered	In operation		
Resorts (including Marinas)	159	140		
Hotels	13	11		
Guest Houses	638	268		
Safari Vessels	142	131		





Waste generation in Maldives (2022, 2025, 2030, 2035)

		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





Waste Management Policy and Legal Framework

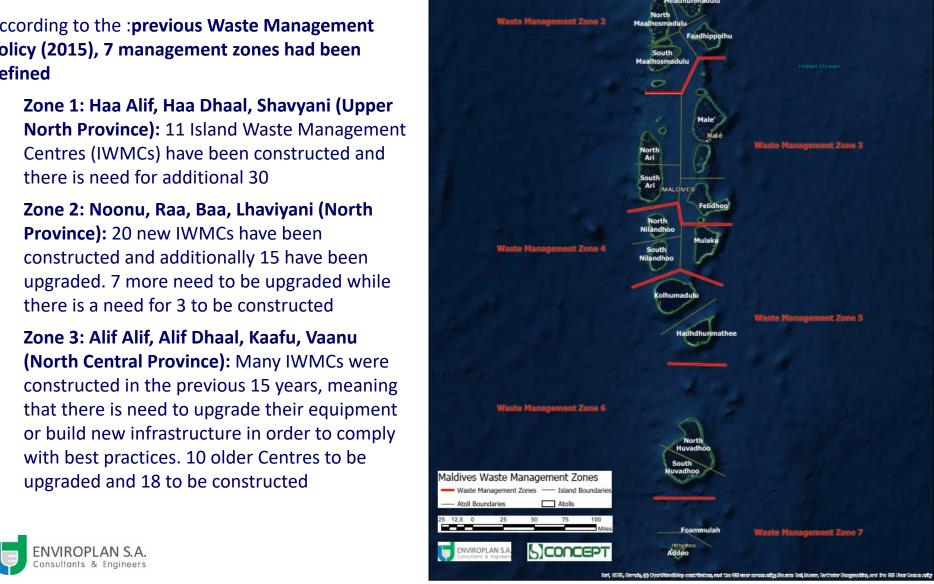
- The Environmental Protection and Preservation Act (EPPA, Act No: 4/93). Framework Law on the Protection of the Environment in Maldives
- **Decentralization Act** (07/2010). Mandates island and municipal councils to provide adequate waste management services.
- National Waste Management Policy 2015 (NWMP2015). Was established with an objective to formulate and implement guidelines and instruments for solid waste management to maintain a healthy environment
- Waste Management Regulation 2013/R-58 (WMR2013). Provides the main regulatory framework for waste management
- **Strategic Action Plan 2019-2023** (SAP2019-2023). Current policy and strategy document. There are four main policies with waste-related targets
- National Policy on Healthcare Waste Management 2016 (NPHCWM2016). Stipulates that all healthcare facilities must be responsible for the safe management of healthcare waste in an environmentally sound manner that minimizes risk to the community and staff involved in management
- Regulation on the Protection and Conservation of the Environment in the Tourism Industry. The Tourism Law (2/99), was formulated for the protection of the environment related to the tourism industry
- Utility Regulatory Authority Act (URAA) (26/2020). The Public Utilities Regulatory Authority as an official authority regulates and oversees the proper management of public utility services in the country, including services related to waste management
- **New Waste Management Bill** (24/2022). Formulated for the purpose of organizing, managing and overseeing the waste management of Maldives in a sustainable manner, protecting the environment and human health by preventing or reducing the adverse impacts of waste and to establish waste management principles, standards and procedures



Current situation in the WM Zones

According to the :previous Waste Management Policy (2015), 7 management zones had been defined

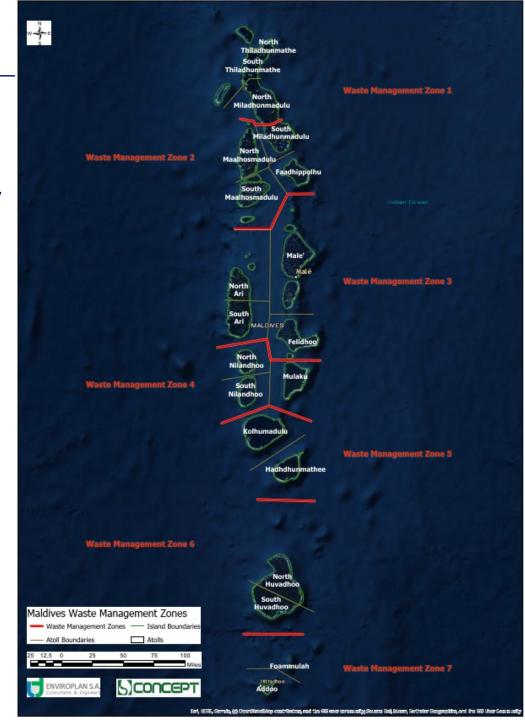
- Zone 1: Haa Alif, Haa Dhaal, Shavyani (Upper Centres (IWMCs) have been constructed and there is need for additional 30
- Zone 2: Noonu, Raa, Baa, Lhaviyani (North Province): 20 new IWMCs have been constructed and additionally 15 have been
- Zone 3: Alif Alif, Alif Dhaal, Kaafu, Vaanu (North Central Province): Many IWMCs were or build new infrastructure in order to comply with best practices. 10 older Centres to be upgraded and 18 to be constructed





Current situation in the WM Zones

- Zone 4: Meemu, Faafu, Dhaalu (Central Province):
 Only 1 new IWMC was constructed in Rinbudhoo island (2018). 13 older Centres, mainly built in 2007 are in need of upgrading. 5 inhabited islands need new Centres
- new IWMCs have been built. 7 older Centres need to be upgraded in order to comply with the newly proposed standards and 8 more need to be built on inhabited islands of the two Atolls
- **Zone 6: Gaaf Alig, Gaaf Dhaal (South Central Province):** 3 new Centres have been built in Waste Management Zone 6, which consists of North Huvadhu (GA) and South Huvadhu (GDh) Atolls. 13 Centres, built in the past need to be upgraded. One (1) new IWMC is planned to be constructed
- Zone 7: Gnaviyani, Seenu (South Province): 1
 Centre was upgraded in 2019, another 1 to be upgraded and 1 to be built

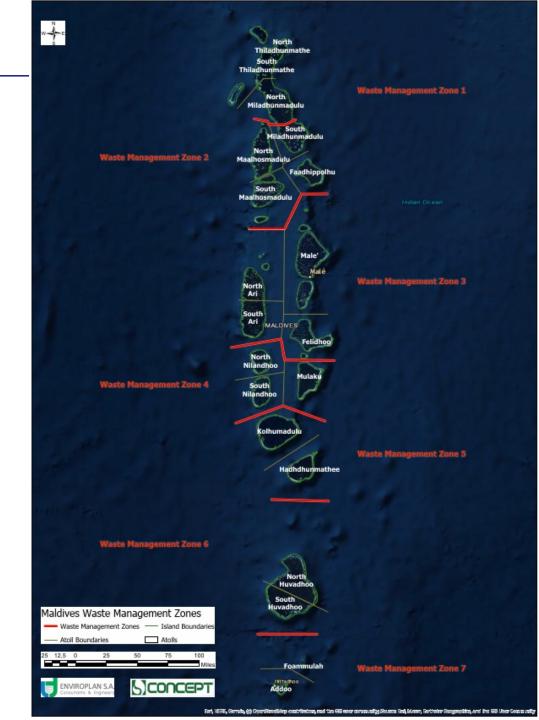




Current situation in the WM Zones

- 111 newly constructed (after 2008) IWMCs
- 16 older and upgraded IWMCs
- 51 current Centres need upgrade
- 66 new IWMCs to be constructed

Source: Ministry of Environment, Climate Change and Technology





Waste generation per Waste Management Zone (target year 2025)

	Scenario 1 (tn/y) - 2025				Scenario 2 (tn/y) - 2025			
	Household and Commercial Waste	Tourism Waste	Total MSW Generation (tn/y)	Total MSW Generation (%)	Household and Commercial Waste	Tourism Waste	Total MSW Generation (tn/y)	Total MSW Generation (%)
Zone 1	19,705	1,156	20,861	7%	17,241	964	18,205	7%
Zone 2	25,208	9,416	34,624	11%	22,057	7,847	29,904	11%
Zone 3	190,581	24,245	214,827	67%	153,432	20,205	173,636	65%
Zone 4	8,221	3,056	11,277	4%	7,193	2,547	9,740	4%
Zone 5	9,975	496	10,471	3%	8,728	413	9,142	3%
Zone 6	10,596	1,777	12,373	4%	9,271	1,481	10,752	4%
Zone 7	12,868	1,157	14,025	4%	11,259	965	12,224	5%
Non-admin islands	2,245	0	2,245	1%	1,964	0	1,964	1%
Total MSW Generation	279,398	41,304	320,703	100%	231,147	34,420	265,567	100%





Current Waste Management Situation in the Inhabited Islands

- The waste management system in Maldives has a decentralized orientation and is implemented through Island Waste Management Centres
- The Centres are used to separate and temporarily store recyclable materials such as plastic, metal, paper and glass, compost the organic material through simple technologies and transport the residues
- Some Centres do **not have sufficient space**, while others are **not fully equipped** with the appropriate machinery
- Households separate municipal waste usually into four, sometimes more, fractions: garden/green, metals, plastics and organic/other/mixed/residual
- Waste is collected in **open trucks and placed by the workers in separate bins** of the vehicle. Although this process is **time-consuming**, it has the potential to achieve **high purity**
- In many cases **participation is low**, or waste is **mixed back** into the vehicle. **Open trucks** are **not a suitable** type of collection vehicle for liquid waste and, moreover, **they are old** and subject to breakdowns
- Island councils charge 100-120 MVR (6 7 €) per household per month, but not all households are registered
- The collection rate is low and in any case the cost of services exceeds revenue
- Some councils sell recyclable materials and receive a small income, while in other cases the materials are stored for long periods
- Waste is usually disposed in dumpsites in an unsystematic way, next to the sea
- Most of the time, waste is incinerated improperly due to limited space and to reduce bulk
- In other cases, residents were reported to throw food waste into a sea cage.





Current Waste Management Situation in the Inhabited Islands













Current Waste Management Situation in Greater Male Area (Zones 3, 4 and 5)

- State-owned company WAMCO, established in 2016, collects and disposes off waste in a) the Greater Male Area, b) the whole Zone 3, c) Addu town and d) Fuvahmulah town, and e) operates the Vahndoo Regional facility
- The **door-to-door collection** service is daily (7 days/week) from each individual apartment, not from the buildings as a whole
- Waste bags are placed in a bin and then loaded onto waste collection vehicles
- WAMCO operates the **Transfer Station**, adjacent to the Tsunami Memorial, where **waste vehicles are unloaded onto three marine vessels**
- Each boat has a capacity of 300 400 tonnes and makes the journey from Male to the industrial island of Thilafushi once or twice a day
- Waste from many resorts and construction sites is also regularly transported via marine vessels and private contractors
- The Thilafushi dumpsite does not operate according to international standards
- The burning of mixed waste continued for many years creating serious air pollution and heavy metal release
- Extensive work was required to spread soil to cover the mass of waste and eventually extinguish the fire
- Recycling activities in Maldives are limited, mainly due to little or no profit (there is no local recycling market, recyclables have to be transported to mainland India, Sri Lanka or Taiwan).
- Lack of space in Male will make future separation at the source a major challenge
- A new Regional Waste to Energy plant is planned at Thilafushi with a capacity of 500 t/day, financed by the Asian Development Bank and national resources





Current Waste Management Situation in Zones 1, 2, 6 and 7

- For Zones 6 and 7 the waste management system includes the following:
- Waste collection system from the Island Waste Management Centres on the inhabited islands
- A regional waste transfer system from the IWMCs to the Regional Management Facility
- Waste Transfer Station (TS) at Vaadhoo, Gaafu Dhaalu Atoll
- Small-scale 50 t/d Regional Incineration Plant on Hithadhoo Island with flue gas treatment and 1 MW electricity recovery. Construction is completed and operation is expected to begin
- For northern Zones 1 and 2, a small-scale incinerator (also 50 t/d) has been constructed in Vahndoo Island (currently under refurbishment)





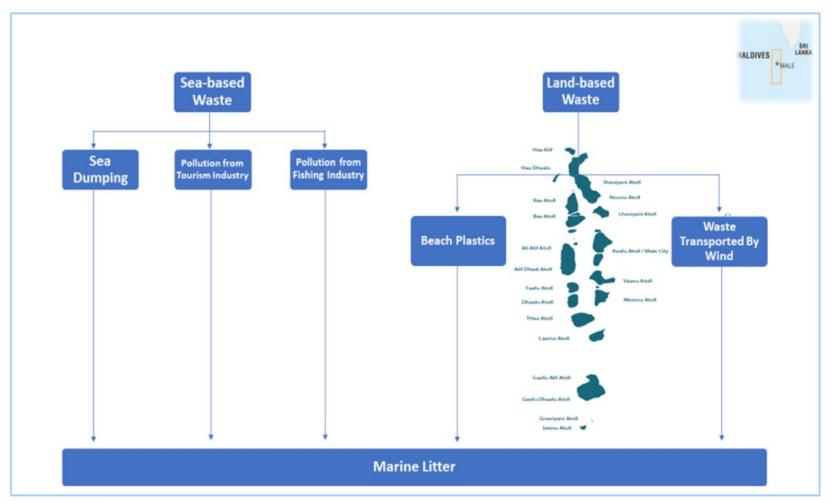
Multi-island character and problems related with waste generation and management

- Population characteristics that affect waste generation:
 - o strong population fluctuations (uneven population distribution) from island to island
 - o strong seasonal fluctuations due to intense tourist activity
- Fragmentation of the management area due to the large number of islands
- Difficulty/weakness in developing a complete waste management system on each island (failure to satisfy the principles of self-sufficiency and proximity)
- Difficulties in finding sites to build waste management infrastructure
- Demand for inter-island sea transport or other types of transport to mainland areas
- Little potential to apply economies of scale
- Geographical isolation and difficulties in developing a local market for recyclables and other products (compost, CLO etc.)





Pathways of marine litter generated from sea-based and land-based activities in Maldives







Composition and Source of Marine Litter in Maldives





New National Waste Management Policy and Strategy 2023-2027

Overarching Principles

- 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 Decentralization**: waste management shall be undertaken as close to the source of generation as possible, taking into account geographical circumstances.



New National Waste Management Policy and Strategy 2023-2027

Goals

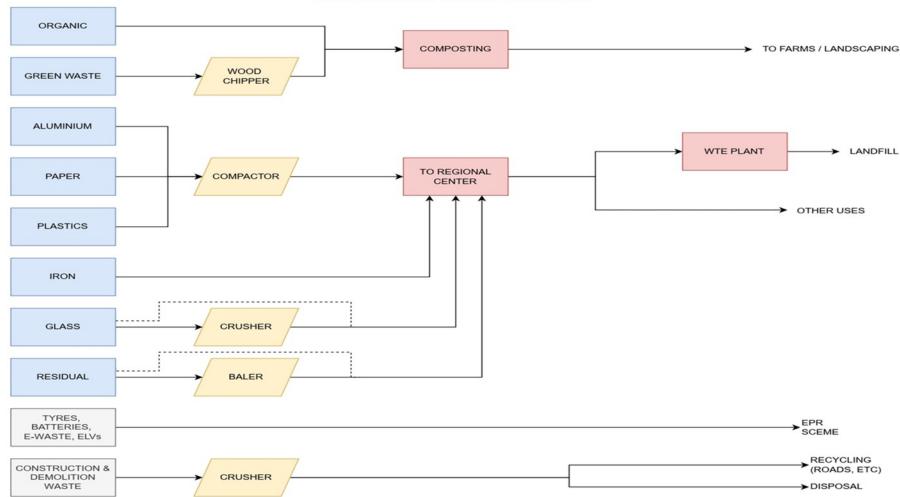
- Goal 1: Develop and enforce secondary regulations, standards, guidelines and plans
- ➤ Goal 2: Strengthen the decentralized waste management model by completing the infrastructure on island and regional level
- > Goal 3: Ensure effective collection and local treatment of organic waste
- ➤ Goal 4: Close 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





Where we want to go

SEGREGATED WASTE STREAMS





New National Waste Management Policy and Strategy 2023-2027 Measures per Goal (1/7)

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

- 1.1 Develop **new regulations** as set in the Waste management Act
- 1.2 Develop **new standards and guidelines** for effective waste management
- 1.3 Develop Island and Regional Waste & Resource Management Plans
- 1.4 Develop National Recycling Strategy, explore markets for recycling and establish synergies
- 1.5 Elaboration of the update of Marine Litter Action Plan
- Goal 2: Strengthen the decentralized waste management model by completing the infrastructure on island and regional level
- 2.1 Construction of new Island Waste & Resource Management Centers
- 2.2 Supply of new vehicles, bins, equipment and sea vessels to enhance segregated collection
- 2.3 Construction of Waste Recycling Plant
- 2.4 Conduct a technical study on optimization of collection service



New National Waste Management Policy and Strategy 2023-2027 Measures per Goal (2/7)

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

- 3.1 Enhance and strengthen the source segregation for organic waste
- 3.2 Establish decentralized composting plants and supply with necessary equipment
- 3.3 Promote initiatives to reduce edible food losses at the retail and consumer levels
- 3.4 Establish pilot project for used cooking oil separate collection
- 3.5 Create a market for products generated through composting of organic waste

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

- 4.1 Cease of open burning of waste in 100% of all inhabited islands dumpsites
- 4.2 Closure and rehabilitation in 50% of all inhabited islands dumpsites (aiming to 100% in the long term)
- 4.3 Field survey risk assessment study for environmental hotspots in Maldives



New National Waste Management Policy and Strategy 2023-2027

Measures per Goal (3/7)

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

- 5.1 Monitor the efficiency of the Single Use Plastics Phase Out Plan 2020-2023 and elaborate the updated Plan 2024-2028
- 5.2 Establishing cooperation with neighboring countries on joint efforts to tackle plastic waste
- 5.3 Voluntary agreements in the business sector to reduce plastic items and packaging
- 5.4 Establish Eco-Centers and support second-hand market
- 5.5 Establish **drinking water refilling stations** in the islands in order to reduce dependence on bottled water
- 5.6 Participation in **international Actions and Forum** related to plastic waste
- 5.7 **Gradually abolish plastic bags** and replace with paper/ compostable bags

Goal 6: Provide for Beaches and Public Areas cleaning

- 6.1 Supply of easily accessible outdoor bins, "Anti-littering" signs and beach cleaning machines
- 6.2 Implement public awareness "Anti-littering" actions in cooperation with NGOs
- 6.3 Implement beaches and Public Areas clean-up actions, with public participation



New National Waste Management Policy and Strategy 2023-2027 Measures per Goal (4/7)

Goal 7: Development of a National Data and Information Registry

- 7.1 **Develop technical specifications** for the National Data and Information Registry (Database)
- 7.2 Implement and operate the National Data and Information Registry. Training of personnel
- 7.3 Elaborate a national waste audit
- Goal 8: Design and implement an effective model for Extended Producers Responsibility (EPR) and Take-Back schemes
- 8.1 Implement **pilot packaging, e-waste and batteries separate collection and recycling projects** in selected areas in Male and other islands
- 8.2 Prepare the horizontal EPR framework for all products subject to EPR
- 8.3 Provide **legal and technical assistance to MoECCT** for ongoing support of EPR implementation through a TA project



New National Waste Management Policy and Strategy 2023-2027

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

- 9.1 Strengthening the public private partnership
- 9.2 **Private sector involved** in the collection, transportation and handling of municipal as well as special (hazardous, C&D, etc.) waste
- 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
- 9.4 Obligation for every citizen to participate in the local waste collection service and tariffs

Goal 10: Close and rehabilitate at least 50% of island dumpsites

- 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
- 10.2 Train and provide specific education to suitable candidates to develop waste management professionals with technical, specialized and certified knowledge
- 10.3 Identity **national training needs** in the sector and incorporate the needs into the National 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



New National Waste Management Policy and Strategy 2023-2027 Measures per Goal (6/7)

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

- 11.1 Develop regulations and Standard Operating Procedures (SOP) on Hazardous Waste activities, such as for characterization, labelling, testing, separate segregation, sea transport, processing and handling of hazardous waste
- 11.2 Develop a reporting system and prepare annual reports on collected, transported and stored HW by type
- 11.3 Assess and expand EPR schemes for certain types of waste. Conduct environmental awareness on the EPR scheme
- 11.4 Construct, equip and operate HW storage facilities in Thilafushi and in Addu City
- 11.5 **Provide collection bins / containers for specific waste types** (batteries, e-waste, tyres etc.) in all Islands. **Implement take-back arrangements**
- 11.6 Conduct a Feasibility Study for ship (MARPOL) waste on a national level
- 11.7 Evaluate synergies of incinerating high calorific value HW and industrial waste in WtE facilities
- 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**
- 11.9 Adoption and implem. of the National Healthcare waste management guideline by all healthcare units
- 11.10 Provide **technical assistance and capacity building to the technical personnel** of authorities and Service Providers
- 11.11 Strengthen the enforcement and monitoring mechanism



New National Waste Management Policy and Strategy 2023-2027

Measures per Goal (7/7)

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

- 12.1 Implement and receive a **national or international environmental certificate** (ISO, Ecolabel, or similar)
- 12.2 Replace plastic goods in the resorts with eco-friendly materials
- 12.3 Organize food re-distribution/ donation of meals not consumed. Undertake monitoring on food losses and reporting
- 12.4 Produce clean compost from organic waste in the resorts

Goal 13: Promoting Waste Prevention and Transitioning to Circular Economy

- 13.1 Develop **National Waste Reduction Plan and Circular Economy Roadmap** to promote reduction (prevention) actions
- 13.2 Assess Food Waste Generation and Prepare Roadmap for Reduction in line with UN Sustainable Development Goal (SDG) 12.3
- 13.3 Reduce hazardous and noxious compounds in various selected products
- 13.4 Develop a voluntary Code of Good Conduct to implement the "right to repair" of electronics and ICT products
- 13.5 Establish Eco-Centers and support second-hand market
- 13.6 Engage producers and importers to promote packaging eco-design
- 13.7 Assess and implement measures such as motives, economic instruments, digital tools, information systems, guidelines and standards





Thank you for your attention!

Follow-up on:

ct@enviroplan.gr

info@enviroplan.gr

www.enviroplan.gr

23 Perikleous & Iras Str., 15344, Gerakas Attikis

Landline: +30 2106105127/8 - +30 2106017386

