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The World Bank

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Report No: PAD2174

INTERNATIONAL DEVELOPMENT ASSOCIATION

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED GRANT

IN THE AMOUNT OF SDR12.80 MILLION
(US$17.50 MILLION EQUIVALENT)

TO THE

REPUBLIC OF MALDIVES

FOR A

MALDIVES CLEAN ENVIRONMENT PROJECT

May 21, 2017

Environment & Natural Resources Global Practice
Maldives and Sri Lanka Country Management Unit
South Asia Region

CURRENCY EQUIVALENTS

Exchange Rate Effective April 30, 2017

Currency Unit =	Maldive Rufiyaa (MVR)
1 USD =	15.40999921 MVR
1 SDR =	1.37102 USD

FISCAL YEAR
January 1 - December 31

Regional Vice President:	Annette Dixon
Country Director:	Idah Z. Pswarayi-Riddihough
Senior Global Practice Director:	Karin Erika Kemper
Practice Manager:	Kseniya Lvovsky
Task Team Leader(s):	James Orehmie Monday, Gaurav D. Joshi

ABBREVIATIONS AND ACRONYMS

AC	Atoll Council
BPEO	Best Practicable Environmental Option
CPF	Country Partnership Framework
CURB	Climate Action for Urban Sustainability – Waste Disposal
DA	Designated Account
DS	Direct Selection
E&S	Environmental and Social
ERC	Environment Research Centre
EPA	Environmental Protection Agency
ESAMF	Environmental and Social Assessment and Management Framework
ESIA	Environmental and Social Impact Assessment
ESMPs	Environmental and Social Management Plans
FM	Financial Management
GDF	Gender Development Framework
GDP	Gross Domestic Product
GHG	Greenhouse gas
GoDenmark	Government of Denmark
GoM	Government of Maldives
GRM	Grievance Redress Mechanism
GRS	Grievance Redress Service
IC	Island Council
ICCR	Implementation Completion and Results Report
ICB	International Competitive Bidding
IEC	Information, Education, and Communication
IDA	International Development Association
IPF	Investment Project Financing
IUFRs	Interim Unaudited Financial Reports
IWMCs	Island Waste Management Centers
IWMPs	Island Waste Management Plans
kg	Kilogram
LECReD	Low Emission and Climate Resilient Development
M&E	Monitoring and Evaluation
MEE	Ministry of Environment and Energy
MEMP	Maldives Environmental Management Project
MNU	Maldives National University
MoFT	Ministry of Finance and Treasury
MoTCA	Ministry of Tourism and Civil Aviation
mt	Metric ton
MVR	Maldivian rufiyaa
NCB	National Competitive Bidding
NGO	Non-governmental organization
O&M	Operation and Maintenance
PAD	Project Appraisal Document
PMU	Project Management Unit

POM	Project Operations Manual
PPSD	Project Procurement Strategy for Development
PRIMA	Portfolio and Risk Management System
RFQ	Request for Qualifications
RPF	Resettlement Policy Framework
RWMCs	Regional Waste Management Centers
STEP	Systematic Tracking of Exchanges in Procurement
SWM	Solid Waste Management
T	Ton
ToR	Terms of Reference
WAMCO	Waste Management Corporation
WDCs	Women's Development Committees
WMD	Waste Management Department

BASIC INFORMATION

Is this a regionally tagged project?	Country(ies)	Financing Instrument
No		Investment Project Financing

[ ] Situations of Urgent Need of Assistance or Capacity Constraints

[ ] Financial Intermediaries

[ ] Series of Projects

Approval Date	Closing Date	Environmental Assessment Category
29-Jun-2017	31-Dec-2023	A - Full Assessment
Bank/IFC Collaboration		
No		

Proposed Development Objective(s)

The Project Development Objective is to improve solid waste management in selected zones.

Components

Component Name	Cost (US$, millions)
Component 1: National Solid Waste Management Strategy and Policy	3.00
Component 2: Regional Waste Management Systems	7.50
Component 3: Island Waste Management Systems	5.00
Component 4: Project Management	2.00
Component 5: Contingent Emergency Response Component	0.00

Organizations

Borrower : Ministry of Finance and Treasury

Implementing Agency : Ministry of Environment and Energy, MEE

PROJECT FINANCING DATA (IN USD MILLION)

[ ] Counterpart Funding	[ ] IBRD	[ ] IDA Credit [ ] Crisis Response Window [ ] Regional Projects Window	[✓] IDA Grant [ ] Crisis Response Window [ ] Regional Projects Window	[ ] Trust Funds	[ ] Parallel Financing

Total Project Cost:	Total Financing:	Financing Gap:
17.50	17.50	0.00
	Of Which Bank Financing (IBRD/IDA): 17.50	

Financing (in US$, millions)

Financing Source	Amount
IDA Grant	17.50
Total	**17.50**

Expected Disbursements (in US$, millions)

Fiscal Year	2017	2018	2019	2020	2021	2022	2023	2024
Annual	0.00	0.64	1.13	1.66	2.79	4.54	5.34	1.40
Cumulative	0.00	0.64	1.77	3.43	6.22	10.76	16.10	17.50

INSTITUTIONAL DATA

Practice Area (Lead)

Environment & Natural Resources

Contributing Practice Areas

Climate Change and Disaster Screening

This operation has been screened for short and long-term climate change and disaster risks

Gender Tag

Does the project plan to undertake any of the following?

a. Analysis to identify Project-relevant gaps between males and females, especially in light of country gaps identified through SCD and CPF

Yes

b. Specific action(s) to address the gender gaps identified in (a) and/or to improve women or men's empowerment

Yes

c. Include Indicators in results framework to monitor outcomes from actions identified in (b)

Yes

SYSTEMATIC OPERATIONS RISK-RATING TOOL (SORT)

Risk Category	Rating
1. Political and Governance	Substantial
2. Macroeconomic	High
3. Sector Strategies and Policies	Moderate
4. Technical Design of Project or Program	Substantial
5. Institutional Capacity for Implementation and Sustainability	High
6. Fiduciary	Moderate
7. Environment and Social	High

8. Stakeholders	Substantial
9. Other	Moderate
10. Overall	High

COMPLIANCE

Policy

Does the project depart from the CPF in content or in other significant respects?

[ ] Yes [✓] No

Does the project require any waivers of Bank policies?

[ ] Yes [✓] No

Safeguard Policies Triggered by the Project	Yes	No
Environmental Assessment OP/BP 4.01	✓	
Natural Habitats OP/BP 4.04	✓	
Forests OP/BP 4.36		✓
Pest Management OP 4.09		✓
Physical Cultural Resources OP/BP 4.11		✓
Indigenous Peoples OP/BP 4.10		✓
Involuntary Resettlement OP/BP 4.12	✓	
Safety of Dams OP/BP 4.37		✓
Projects on International Waterways OP/BP 7.50		✓
Projects in Disputed Areas OP/BP 7.60		✓

Legal Covenants

Sections and Description

Project Board:GoM to establish a Project Board to serve as the steering committee, supporting the PMU providing inter-agency/inter-ministerial cooperation and coordination, timely decision making for, and oversight of Project activities.

Recurrent: Yes, Due Date: 1 month after effectiveness, Frequency: Project duration.

Sections and Description

Project Management Unit: MEE to maintain a Project Management Unit (PMU) under the WMD, headed by the head of the WMD and staffed with competent personnel in adequate numbers in order to coordinate the day to day implementation of Project activities.

Recurrent: Yes, Due Date: N/A, Frequency: Project duration.

Sections and Description

Internal Auditor: GoM/MEE to hire and thereafter maintain a firm of chartered accountants to serve as MEE's and the PMU's internal auditors carrying out regular financial management and procurement audits for the Project.

Recurrent: Yes, Due Date: 3 months as ofeffectiveness, Frequency: Project duration.

Sections and Description

Project Operations Manual: GoM/MEE to carry out the project in accordance with the Project Operations Manual.

Recurrent: Yes, Due Date: N/A, Frequency: Project duration.

Sections and Description

Annual Work Plan: GoM/MEE to prepare, furnish to, and review with, the Association the annual work plans and budgets for the Project containing detailed programs of Project activities for the next following fiscal year, and thereafter implement such annual work plans as reviewed/discussed with the Association.

Recurrent: Yes, Due Date: October 31, Frequency: Annual.

Sections and Description

Regional Waste Management Centers: GoM to refrain from initiating any activities for the establishment of a RWMC for Zones IV and V until and unless it has carried out a feasibility study and a best practicable environmental option study.

Recurrent: No, Due Date: N/A, Frequency: N/A.

Sections and Description

WAMCO: Upon construction of the RWMC referred to in Component 2, GoM shall take all actions required to transfer to WAMCO the concession over the assets, licenses and permits of such centers for WMCO to operate and maintain the RWMC in accordance with the safeguards documents.

Recurrent: No, Due Date: N/A, Frequency: N/A.

Sections and Description

Island Waste Management Centers: GoM/MEE to: (a) publicly invite ICs of islands in Zone IV and V to submit IWMPs pursuant to the POM; (b) screen the IWMPs in accordance with the eligibility/preparedness criteria and selection procedures set forth in the POM; and (c) enter into written agreement with the ICs of the selected IWMPs under terms and conditions satisfactory to the Association, for the provision of “in kind” assistance for the implementation of the respective IWMPs.

Recurrent: Yes, Due Date: N/A, Frequency: Project duration.

Sections and Description

Safeguards Documents: GoM/MEE to carry out the Project, and/or ensure that the Project is carried out, in accordance with the ESAMF, the ESIAs and/or the ESMPs prepare or to be prepared, pursuant to the ESAMF.

Recurrent: Yes, Due Date: N/A, Frequency: Project duration.

Sections and Description

Safeguards Screening: GoM/MEE to refrain from awarding any civil works contract and/or undertaking any activities under the Project, until and unless: (a) the proposed civil works/activities have been screened by the PMU and the respective ESIA(s) has/have been prepared in accordance with the ESAMF; (b) the respective ESMP(s) required for such civil works/activities pursuant to the ESAMF/ESIA(s) has/have been prepared and submitted to the Association for review and the Association has notified GoM/MEE of its no-objection thereto; and (c) the foregoing safeguards document(s) has/have been publicly disclosed by GoM/MEE in local language(s) at the relevant Project’s sites at least: (i) 45 days prior to the award of the contract for the related civil works/Project activities other than for RWMC, and (ii) 120 days prior to the award of the contract for the related civil works/Project activities for RWMC.

Recurrent: Yes, Due Date: N/A, Frequency: Project duration.

Sections and Description

Permits and Clearances: GoM/MEE to ensure that, prior to commencing any activities under the Project: (a) all necessary permits and clearances for such activities have been obtained; and (b) all pre-constructions conditions imposed by thegovernment authority/ies under such permit(s) or clearance(s) have been complied with/fulfilled; and (c) all required resettlement measures set forth in the applicable ESMP(s) shall have been fully executed, including the full payment of compensation prior to displacement/and or the provision of relocation assistance to all Displaced Persons.

Recurrent: Yes, Due Date: N/A, Frequency: Project duration.

Sections and Description

Contractor's Safeguards Obligation: GoM/MEE to ensure that each contract for civil works and/or consulting services under the Project includes the obligation of the relevant contractor/service provider to comply with the safeguards documents applicable to such civil works/consulting services commissioned/awarded under said contract.

Recurrent: Yes, Due Date: N/A, Frequency: Project duration.

Sections and Description

Safeguards Monitoring and Reporting: GoM/MEE to maintain monitoring and evaluation protocols and record keeping procedures adequate to supervise and assess the implementation of/compliance with the safeguards documents and submit to the Association, as part of the Project Reports, consolidated reports thereof.

Recurrent: Yes, Due Date: N/A, Frequency: Semi-Annual.

Sections and Description

Grievance Redressal Mechanisms: GoM/MEE to maintain and operate, and cause WAMCO and the ICs to maintain, a multi layered grievance redressal mechanism for the handling of any stakeholder complains arising out of the implementation of the Project.

Recurrent: N/A, Due Date: N/A, Frequency: Project duration.

Sections and Description

Ineligible Expenditures: GoM/MEE to ensure that any land acquisition required for the Project, and all compensation, resettlement and/or rehabilitation payments to displaced persons will be paid exclusively out of its own resources.

Recurrent: Yes, Due Date: N/A, Frequency: Project duration.

Sections and Description

Contingency Emergency Response (CER) Operations Manual: In order to trigger the CER component, GoM shall: (i) prepare and furnish to the Association for approval a CER Operations Manual detailing activities, expenditures and implementation arrangements; (ii) identify and maintain a Coordinating Authority with adequate staff and resources; (iii) declare an eligible crisis or emergency; and (iv) prepare and disclose any required safeguards documents.

Recurrent: No, Due Date: N/A, Frequency: N/A.

Sections and Description

Mid-Term Reviews: GoM/MEE to: (a) carry out, jointly with the Association, midterm reviews to assess the status of Project implementation as measured against the performance indicators, providing the Association with a report including the monitoring and evaluation results, one month prior to such joint reviews; and (b) thereafter take all measures required to ensure the efficient completion of the Project and the achievement of its development objectives, based on the conclusions and recommendations of such report.

Recurrent: No, Due Date: 18 and 36 months after effectiveness, Frequency: N/A.

Conditions

Type	Description
Disbursement	CER Component No proceeds to be disbursed for the financing of the CER Component until and unless, GoM has: (a) determined/declared an Eligible Crisis or Emergency, and the Association agreed with such determination: (b) prepared and disclosed all safeguards documents required for any activities to be carried out under the CER Components; (c) provided evidence that a coordinating authority has been established with adequate staff and resources; and (d) adopted a CER operations manual.

PROJECT TEAM

Bank Staff

Name	Role	Specialization	Unit
James Orehmie Monday	Team Leader(ADM Responsible)	Senior Environmental Engineer	GEN06
Gaurav D. Joshi	Team Leader	Senior Environmental Specialist	GEN06
Asif Ali	Procurement Specialist(ADM Responsible)	Senior Procurement Specialist	GGO06
Bernadeen Enoka Wijegunawardene	Financial Management Specialist	Senior Financial Management Specialist	GGO24
Abdelaziz Lagnaoui	Team Member	Lead Environmental Specialist	GEN06
Ahmed Mohamed Khaled Mostafa Abdel Wahid	Team Member	Consultant Solid Waste Technical Adviser	GEN06
Darshani De Silva	Team Member	Senior Environmental Specialist	GEN06
Frank Van Woerden	Peer Reviewer	Lead Environmental Engineer	GEN2A
Lisa Congyuan Yao	Team Member	Consultant Greenhouse Gas Accounting Specialist	GSUGL
Martin M. Serrano	Counsel	Senior Counsel	LEGES
Mehnaz Tasnim	Team Member	Consultant Gender Specialist	GSU12
Merlyn Nikitha Dmello	Team Member	Team Assistant	CMEUD
Mokshana Nerandika Wijeyeratne	Safeguards Specialist	Environmental Specialist	GEN06
Niluka Nirmalie Karunaratne Sriskanthan	Team Member	Team Assistant	SACSL
Ning Yang	Peer Reviewer	Senior Environmental Engineer	GEN2A
Poonam Rohatgi	Team Member	Program Assistant	GEN06
Satish Kumar Shivakumar	Team Member	Financial Specialist	WFALA
Shadiya Adam	Team Member	Gender and Citizen Engagement	SACSM
Shenhua Wang	Peer Reviewer	Senior Urban Development Specialist	GSU12
Silpa Kaza	Team Member	Greenhouse Gas Accounting Specialist	GSUGL

Sumith Pilapitiya	Peer Reviewer	Consultant Solid Waste Specialist Advisor	GEN06
Susrutha Pradeep Goonesekera	Safeguards Specialist	Social Development Specialist	GSU06
Tijen Arin	Team Member	Senior Environmental Economist	GEN2B
Ulrich K. H. M. Schmitt	Team Member	Program Leader	SACSL

Extended Team

Name	Title	Organization	Location

MALDIVES
MALDIVES CLEAN ENVIRONMENT PROJECT

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I. STRATEGIC CONTEXT

A. Country Context

1. **The Republic of Maldives comprises 26 atolls of 1,192 small coral islands; the 188 inhabited islands are home to 338,000 people**. Despite its uniquely challenging geography, remote location, and widely dispersed small population, Maldives has become an upper-middle-income country by building on its extraordinary natural assets to promote growth and socio-economic development. The country has benefited from rich marine fisheries and from high-end tourism that generates sizeable rents, which have been redistributed to the population to address development challenges.

2. **GDP per capita increased from US$268 in 1980 to US$8,356[1] in 2015, mainly driven by tourism and non-tradable activities related to tourism.** The most recent household survey data (2009/10) show that 5.6% of the population lives on less than US$1.90 per day; 18.29% live below the poverty line of US$3.10 a day. The incidence of poverty is similar to that of other upper-middle-income countries. Maldives provides near-universal access to basic electricity, clean water, and sanitation services. Its human development index ranking is second only to Sri Lanka among South Asian countries.

3. **Heading into the future, however, Maldives faces considerable economic, public management, and environmental challenges.** The development model is dominated by a volatile tourism industry, which is the biggest source of GDP growth but inherently vulnerable. The cost of delivering public services to a small, widely dispersed population is very high and creates significant fiscal challenges. Economic vulnerability is exacerbated by high transport costs, a small domestic market, and a shortage of local skilled labor. Despite cuts to electricity and food subsidies, public debt is already high, estimated at 69.5% of GDP in 2016. It is projected to increase and peak in the medium term, owing to the large-scale public infrastructure program currently underway. The program includes development of the international airport, construction of a bridge between the airport and Malé (the capital city), and a proposed port relocation and development initiative that may boost growth in the longer term but will likely add to significant fiscal and external risks in the short term.

4. **Environmental management challenges are also increasing**. They include the impacts and risks arising from climate change, threats to corals reefs and fisheries, and the unresolved issue of how to manage increasing amounts of solid waste generated in the congested capital, in the tourist resorts that house well over 1 million guests yearly, and the inhabited outer atolls and islands.

B. Sectoral and Institutional Context

[1] World Bank Staff Country Reports

5. **The generation and management of solid waste is one of the most pressing environmental challenges in Maldives.** An estimated 365,000 tons of solid waste are generated annually. Most recent estimates indicate that solid waste is generated at a rate of 1.8 kg per person per day in Malé, 0.8 kg per person per day on the other inhabited islands, and 3.5 kg per person per day in resort islands. In terms of total waste generation, the country's resort islands and international airport generate waste at nearly six times the rate of the resident local population. Table 1 is an overview of waste composition in the Maldives.

Table 1: Composition of waste streams from various sources, Maldives

Category	Islands	Resorts
Food, garden/yard waste, paper	70%	80%
Recyclables: metals, plastic	3%	5%
Residuals: construction debris, organic and inorganic waste, hazardous substances, etc.	27%	15%
TOTAL	**100%**	**100%**

6. **Current practices for handling, transporting, and treating waste threaten the county's prominence as a pristine marine environment and premium tourist destination**. Plastics are washing up on the otherwise uncontaminated beaches. Empirical evidence shows that years of dumping plastics and other waste in the sea are destroying the coral reefs that are vital to national fish stocks and livelihoods. The fisheries sector alone provides a livelihood for 26% of poor households and 11%[2] of all employment nationally. The coral reefs also play a pivotal role in attracting tourism. Damaged reefs are less able to protect the atolls and islands from the impacts of climate change, particularly rising seas, which are an existential threat for Maldives. Dumping of waste into the open sea, and open burning of waste across the archipelago, create significant public health risks; burning, for example, releases highly toxic gases and carcinogens into the environment.

7. **Most waste generated in the Malé region is mixed and untreated; it is transported daily by boat to Thilafushi, an island near Malé, and deposited on land where it is openly burned in an uncontrolled manner**. Other inhabited islands follow a similar practice of open burning and/or dump their waste into the sea. The resorts send their waste to Thilafushi or practice their own treatment, such as local incineration and composting. While resorts are required by law to have on-site incineration facilities, the majority do not operate their incinerators, with the exception of some resorts that handle waste responsibly, as part of a commitment to a clean environment and to being socially responsible enterprises. The large amount of waste generated by airport and bridge construction is also transported to Thilafushi. The intended volume reduction and pest control achieved by burning waste in Thilafushi is minimal due to the relatively low temperatures achieved and anaerobic conditions sustained by this practice.

[2] World Bank Staff Country Reports

8. **Inhabited islands rarely practice systematic waste management**. Regular waste collection from waste generators (households, businesses, and schools and other institutions) does not exist on most islands. Households and businesses generally use their own means to dump their waste into the ocean or leave it at uncontrolled dumpsites where it is burned periodically. The cost of transportation prohibits the shipment of waste to Thilafushi. Most waste generated on the islands consists of organic materials, but households generally do not practice composting because of the odor (worse in the hot climate) and rodent problems. Plastic water bottles are increasingly used by inhabitants who mistrust the quality of local water. Recycling and waste minimization efforts are often ad hoc, driven by individuals rather than systematic support from local councils or residents. At the same time, unsightly waste dumps and littering on beaches, including waste washed up by the sea, are a major liability for tourism development in the inhabited islands, where other economic activities have extremely limited potential.

9. **The government has responded to these challenges through policies and programs designed to address them in an integrated, sustainable way**. The President of Maldives has made solid waste management a top priority of his administration. The Ministry of Finance and Treasury (MoFT) consistently makes significant budget allocations to the Ministry of Environment and Energy (MEE), which is responsible for coordinating policy and managing and monitoring implementation of operational measures to address these issues. Except for designated cities where MEE has direct responsibility (including Malé, Addu, and Fuvahmulah), local Island Councils (ICs) are responsible and empowered to make decisions regarding waste management. The Waste Management Corporation (WAMCO), a recently revived public corporation owned by the government, is tasked with operating Regional Waste Management Centers (RWMCs). In 2016, WAMCO was contracted by MEE to manage waste by the cities of Addu, Fuvahmulah, and Malé (including Thilafushi). The Environmental Protection Agency (EPA, a separate entity created by presidential decree) enforces provisions of the Waste Management Regulation 2013.

10. **The government has highlighted the importance and urgency of introducing a sustainable, integrated waste management system in the Greater Malé Region (Zone III)[3] to end uncontrolled pollution and opening burning at the Thilafushi dumpsite for all of the environmental, public health, and socio-economic reasons described earlier**. Given the complexity and scale of the problem at Thilafushi, cost estimates to successfully address Zone III range from US$80 million to US$120 million, which is beyond the capacity of the government and any one development partner to finance in Maldives. There is also a need for analyzing and building consensus on the technical and institutional approach for Thilafushi as well as on a financially viable operational model for the site. The government has committed to initiating feasibility studies. The World Bank will engage closely in future consultations, but Thilafushi is not included in the scope of the proposed project because of the current stage of deliberations.

[3] For the administration of solid waste, MEE divides the country into seven geographic zones, illustrated in the project map in *Annex 6*.

11. **A key pillar of government policy is to establish RWMCs in designated zones across the archipelago.** These centers are to provide treatment and disposal services for the inorganic and non-compostable organic waste that individual Island Waste Management Centers (IWMCs) collect from communities in each zone. The role of the IWMCs is to compost suitable organic waste and store other waste in a segregated manner until shipment to the RWMC. MEE is working on several initiatives to roll out the RWMC and IWMC approach. The government introduced a Waste Management Regulation in early 2013 to: (a) implement measures to minimize impacts on human health; (b) formulate and implement waste management standards; (c) implement an integrated framework for sustainable waste management; (d) encourage waste minimization, reuse, and recycling; (e) implement the polluter-pays principle; and (f) introduce an approach of extended producer responsibility. As noted, EPA enforces this regulation.

12. **The government continuously evaluates its programs, policies, and regulations to make course corrections where necessary**. With respect to policy changes, MEE drafted a bill for consideration of the Majlis (the Maldives parliament), which if approved will result in a separate enactment covering management of all waste in the country. This draft is currently under advanced review within the Attorney General's office, and is expected to be presented to the Majlis for deliberations in 2017. The government also launched its Saaffu Raje ("Clean Maldives") initiative in 2015 and has started activities across all seven zones. The program has provided guidance to Island Councils to prepare Island Waste Management Plans (IWMPs) and get them approved.

13. **Even with some successes and a notable policy commitment, countrywide implementation of waste management policies and regulations will require major strides in overcoming institutional, financial, and logistical constraints.** Encouraging examples of success are found at Ukhulhas in North Ari Atoll, and emerging good practices in Zone II—supported by the Maldives Environmental Management Project (MEMP), financed by the International Development Association and closed in June 2016. Even so, much of the country still lacks integrated waste management facilities. Of the 117 IWMCs constructed since the 2004 tsunami, most function only partially, and some are defunct. Few treatment facilities for solid waste operate systematically, with the exception of a subset of resorts (mentioned earlier) that handle their waste responsibly. Island-level waste management requires frequent, efficient, and reliable waste collection from waste generators; sufficient and sustainable funding both for waste collection and IWMC operations; strict enforcement of the ban on open or ocean-dumping of waste, and regular transfer of inorganic waste to RWMCs. It also requires improvements in the capacity of Island Council staff to plan and implement waste management.

14. **It is expensive and logistically challenging to operate RWMCs, including transferring waste from the resort islands.** Experience from MEMP indicates that most Island Councils are barely able to raise funds to cover the costs of island operations, so subsidies, either from the government budget or resort islands, will be needed to support the transfer of waste to RWMCs. Transportation costs can account for 30–50% of the operating costs, because large seaworthy vessels are required to transport waste safely from (often remote) islands across open seas to the waste management centers. A tariff system acceptable to the resort islands, coupled with a strict enforcement mechanism, is required to

ensure proper disposal of all waste by transferring inorganic waste to RMWCs, composting organic waste, and incentivizing waste reduction.

15. **Overcoming these obstacles will require sustained planning over the medium to long term, with stronger emphasis on waste recycling and reduction.** Care must be taken not to design waste disposal facilities, such as incinerators, in a way that creates additional demand for waste. In addition, the remoteness of the islands and small volumes of recyclables, complemented by the inherent cyclical behavior of the global recyclables market, complicates this planning problem and requires creative solutions. The Maldives can learn from experiences around the world in this regard and may consider (for example), economic incentives for recycling and reuse, such as taxes on plastic bottles or plastic bags, or outright bans on such items. It may also consider exporting recyclables accumulated at RWMCs via the existing, mostly one-way ocean-trade links with India, a major buyer of recyclables. Efforts should be initiated to translate the principle of extended producer responsibility, enshrined in the Waste Management Regulation, into action, recognizing that success will require collaboration among multiple stakeholders, some with entrenched interests in the current system.

16. **It is difficult for the private sector to participate in these efforts in the short to medium term, given the minimal economies of scale and the perceived and real risks in the areas of public financing and management capacity**. Significantly more regulatory improvements are required, as well as institutional capacity building and infrastructure investments, before commercial participation with private capital can be considered. Some areas, such as those near Greater Malé, are inherently attractive to private capital because of the presence of resorts and the potential for higher income from larger resident populations. Yet recent failures with public-private partnerships in other sectors have reduced the opportunities to leverage private capital for such ventures. In the absence of private capital, public funding is needed to ensure that Maldivians have access to sustainable solid waste management services, and to protect the country's economic assets and the environment.

17. **A decade-long commitment has delivered progress in addressing solid waste management, provided valuable lessons, and raised awareness of this complex and continuing development issue.** The World Bank has engaged with the government over the past decade to address some of the most difficult solid waste management (SWM) challenges. This engagement has fully demonstrated the government's strong conviction that SWM is a critical developmental issue for the Maldives. Implementation of MEMP moved some positive policy and institutional developments forward, and helped Maldives implement new technical approaches such as the island and regional waste management centers. Even so, the limited institutional and human capacity in the sector, and the gap between the cost of providing SWM services and the government's willingness and ability to pay for them, pose serious risks to the operational and financial sustainability of the sector. Key elements of MEMP outputs have yet to become fully operational.

18. **Given the country's unique SWM challenges and the scale of the potential positive environmental, social, and economic impacts of successfully addressing those challenges, the World Bank plans to continue its support to the sector through the proposed project.** In light of lessons from past

engagements, the proposed project will support and strengthen the decision-making process that will identify technical solutions to be implemented under the proposed project. The decisions on technical solutions will be based on engineering, economic, financial, and institutional capacity criteria. Through this framework approach,[4] the project will enable the provision of targeted support, information, and analysis to the SWM institutions of the Maldives at each critical stage of decision making and project implementation. This flexibility in project design permits adjustments to the project's interventions when warranted. Recognizing the lessons on the sector's operational and financial sustainability, the proposed project will also conduct extensive analytical work to clarify the financial and economic drivers affecting the sustainability of SWM in the context of the Maldives, including the issues of affordability, cost recovery, and service standards.

19. **The World Bank recognizes the high risks to continued engagement in SWM in the Maldives, and to the achievement of the project objectives**. In brief, the country's macroeconomic and fiscal situation may limit government's financial contributions to the sector, which would in turn affect the sector's financial and operational viability. The technical design of the project in the form of a framework approach provides flexibility, but it may increase the risk of delays or cost overruns. The limited institutional capacity and the involvement of various stakeholders with sometimes misaligned incentives may limit progress on reforms. These risks and the corresponding risk management measures are detailed in the Risk section of this document.

C. Higher Level Objectives to which the Project Contributes

20. **The project is consistent with the World Bank Group's twin goals of achieving poverty reduction and shared prosperity in a sustainable manner.** It is also aligned with the Country Partnership Framework (CPF) for the Maldives discussed at the IDA Board on April 26, 2016 (Report No. 103724-MV), particularly with CPF Objective 2 (Strengthening Natural Resource Management and Climate Resilience). The proposed project is listed in the CPF as a deliverable during the current period.

21. **The proposed project will support development and implementation of the government's national waste management strategy and policy, and it will improve capacity across the country for SWM in line with best practice suitable for a high-middle income small island state.** It will advance the Solid Waste Management Policy 2015 objective of providing each inhabited island with an integrated waste management system that meets the requirements of the population and quantity and type of waste generated in the selected zones. The proposed project may also help to halt damage to the local environment—and more importantly to the coral reefs and open seas—from indiscriminate waste disposal, especially of plastic waste. In that way, the project helps to address important challenges: preserving the Maldives as an unspoiled destination (which attracts the high-end tourism that has powered the country's impressive growth), increasing resilience to rising sea levels, and protecting the health of people and the ocean.

[4] The framework approach is presented in detail in the Project Description (Section III).

II. PROJECT DEVELOPMENT OBJECTIVES

A. PDO

22. **The Project Development Objective is to improve solid waste management in selected zones.**

B. Project Beneficiaries

23. **The main beneficiaries of the project will be local residents of participating islands in the selected zones.** The project will specifically target women to ensure they fully participate in and benefit from project activities. In addition, the Waste Management Department (WMD) of MEE, the EPA, the Island and Atoll Councils (ACs) participating in the proposed project, and WAMCO will benefit from the project's support to increase their capacity. Tourists visiting the participating islands in the selected zones may also experience a cleaner environment than in the absence of the proposed project. Effective management of solid waste will also help to reduce ocean litter, which would have a wide impact extending across and beyond the Maldives.

C. PDO-Level Results Indicators

24. **The PDO will be measured through five project-level indicators:** (i) RWMC operational under project (number); (ii) share of total waste in selected zones collected by the IWMCs (disaggregated by inorganic and organic waste) (%); (iii) share of the organic waste in selected zones treated in IWMCs (%); (iv) quantity and share of inorganic waste in selected zones stored and transported to RWMCs (mt/%); (v) share of target beneficiaries with rating "satisfied" or above with the application of the solid waste management approach (user fees, environmental benefits, reliability) (disaggregated by gender).

III. PROJECT DESCRIPTION

A. Project Components

25. **Based on lessons from implementing MEMP, the proposed project adopts a general framework approach, which is intended to provide flexibility in implementation in view of the complex challenges to be addressed, the complex implementation environment, and limited implementation capacity**. While some project activities have already been identified during preparation (including technical assistance and capacity-building activities), the framework approach requires a feasibility assessment process, including Best Practice Environmental Options (BPEO) studies, detailed feasibility studies, and Environmental and Social Impact Assessments (ESIAs), which must be completed before considering any physical and operational investments to establish an integrated waste management system for the targeted Zones IV and V. At project mid-term, the results and recommendations of the feasibility study process will be reviewed to (a) make decisions

on the specific investments, on their locations, and on technology choices and (b) allocate funds to finance those investments.[5] The first mid-term review is expected to take place 18 months after project effectiveness. A second mid-term review would take place 18 months after the first review to take stock of implementation and to make course corrections, as needed.

26. In addition, the proposed project will support investments to operationalize the RWMC introduced in Zone II under MEMP, which will include financing to optimize operations of the regional facility at Vandhoo and support household collection, transportation, and treatment of waste in the remaining islands in Zone II.

27. The project includes five components, summarized below. For a detailed project description, *see Annex 2*.

Component 1: National Solid Waste Management Strategy and Policy (US$3.00 million)

28. This component aims to support the government's efforts to address current challenges to effective SWM in the country. It has three sub-components.

29. **Sub-Component 1.1—Solid Waste Management Strategy**. This sub-component will provide technical assistance for the analysis and implementation of strategic measures addressing current issues on solid waste management, including: (a) preparation of a National Solid Waste Management Strategy; (b) revision of the National Solid Waste Management Policy; (c) quantum and collection of user-fee and tariffs for the collection and treatment of wastes; (d) reduction at source of in select waste streams at source and recycling options therefor; (e) analysis of options to increase uptake of bulk water as an alternative to water in plastic bottles; (f) feasibility of a waste tracking system; (g) development of an extended producer responsibility strategy for the Maldives; (h) economic incentives for recycling and reuse of waste streams; and (i) designing and implementing a national and/or zone-specific information, education, and communication (IEC) campaigns to promote household waste segregation and minimization, and uptake of bulk water.

30. **Sub-Component 1.2—Feasibility Studies and Investment Preparation.** This sub-component will provide technical assistance for the carrying out of a best practical environmental option study and investment pre-feasibility and feasibility studies for determining the most suitable integrated solid waste management system for Zones IV and V, as well as: (a) the specialized environmental and social impact assessments and management plans therefor; and (b) facility/systems management plans.

31. **Sub-Component 1.3—Institutional Capacity Building.** This sub-component will: (a) build capacity of local institutions and individuals—including the Maldives National University (MNU), WAMCO, EPA, and WMD—in the solid waste management sector; (b) support the organization of, and participation in, national and international solid waste management events to exchange knowledge experience and

[5] The investments will be for goods, works and services.

lessons learned; and (c) finance the operations and maintenance contracts of the Vandhoo Island's regional waste management center.

Component 2: Regional Waste Management Systems (US$7.50 million)

32. This component aims to fully operationalize the RWMC for Zone II established under MEMP, and to support the establishment and operation of SWM systems in Zones IV and V based on the feasibility studies conducted under Component 1. This component has 100% climate mitigation co-benefits.

33. **Sub-component 2.1—Regional Waste Management System in Zone II.** This subcomponent will provide equipment and build storage augmentation facilities and access roads for the operationalization of the RWMC set up in Vandhoo under MEMP. The equipment needs identified include a Jib crane to lift waste containers from vessels bringing waste to the island, a solid waste sorting line, and an excavator.

34. **Sub-component 2.2—Regional Waste Management System in Zone IV and V.** This sub-component will: (a) establish a new common final disposal facility for Zones IV and V, including ancillary facilities and related waste management services, pursuant to the studies carried out under Sub-Component 1.2; (b) provide support to WAMCO through an international contractor for the operation and maintenance of the established facilities; and (c) pilot public auctions of recyclables to scale up recyclable programs for key waste streams.

Component 3: Island Waste Management Systems (US$5.00 million)

35. This component aims to support the government in developing and completing island-level facilities for managing the collection, segregation, on-site treatment, and storage of residual waste until final transfer to the common facility. The candidate zones to be included are Zones IV and V, in addition to residual activities in Zone II. This component has 100% climate mitigation co-benefits.

36. **Sub-component 3.1—Island Waste Management System in Zone II.** This sub-component will: (a) provide equipment and mobilization assistance to the Island Councils in Zone II required to improve the capacity utilization of the RWMC at Vandhoo Island, in Zone II, and (b) promote/pilot the use of bulk water dispensers to replace water bottles in Zone II. The study supported under Sub-component 1.1 will inform this effort to determine the feasibility of using such bulk water schemes more widely.

37. **Sub-component 3.2—Island Waste Management System in Zones IV and V.** This sub-component will prepare and implement IWMPs across the atolls in Zones IV and V. The support will include investments to operationalize one of the two or three possible models of integrated waste management systems, depending on population, waste generator profile, land availability, and other relevant parameters. To be eligible for funding, each Island Council will need to have an IWMP approved by the EPA, be subject to an Environmental Assessment and Social Assessment in line with the Environmental and Social Assessment and Management Framework (ESAMF), and have fixed a tariff from each generator of solid waste (whether it is a household or commercial/industrial establishment) to support implementation of the IWMP. Funding is expected to be sufficient to cover all potentially eligible islands in these two zones. This effort will be revisited and updated during mid-

term reviews. Note that some islands in Zone V are already supported under the government's Low Emission Carbon Resilient Development (LECReD) program, funded by the Government of Denmark and implemented by the United Nations Development Programme to assist Laamu Atoll and its islands by mainstreaming LECReD into local development planning and service delivery. *Detailed selection criteria are provided in Annex 2*.

Component 4: Project Management (US$2.00 million)

38. This component will strengthen MEE's institutional capacity for project implementation through the establishment and maintenance of a Project Management Unit (PMU) to manage, implement, monitor, and evaluate project activities, including: (a) carrying out financial management and procurement activities; (b) establishing and operating adequate fiduciary and social and environmental management systems, as well as a grievance redress mechanism; and (c) carrying out the project's outreach and communications campaigns, as well as managing the grievance redress system. It will cover staff costs and operational expenses for a communication specialist, monitoring and evaluation (M&E) specialist, and civil engineer. Support staff (such as project coordinators, an assistant procurement officer, and assistant financial management officer) will be drafted into the PMU as needed.

Component 5: Contingency Emergency Response (US$ 0 million)

39. This component will provide immediate response to an eligible crisis or emergency, as needed. Following an eligible crisis or emergency, the government may request the World Bank to reallocate project funds to support response and reconstruction. To trigger this component, the Government of the Maldives would need to declare an emergency or provide a statement of fact justifying the request for the activation of the use of emergency funding. This component would draw from the uncommitted Grant resources under the project from other project components to cover an emergency response.

B. Project Cost and Financing

40. The project will be an Investment Project Financing (IPF) instrument funded by an International Development Association (IDA) Grant in the amount of US$17.50 million equivalent over an implementation period of six years.

41. A retroactive financing amount of up to US$1.185m equivalent would be available from this grant for eligible expenses incurred on or after February 1, 2017.

42. Table 2 summarizes the project costs by component, including contingencies but excluding taxes.

Table 2: Project cost by component (US$ million)

Component	Description	Project costs (US$ m)	Financing	
			IDA	% financing
Component 1	National Solid Waste Management Strategy and Policy	3.00	3.00	100
Component 2	Regional Waste Management Systems	7.50	7.50	100
Component 3	Island Waste Management Systems	5.00	5.00	100
Component 4	Project Management	2.00	2.00	100
Component 5	Contingency Emergency Response	0.00	0.00	100
Total		**17.50**	**17.50**	

C. Lessons Learned and Reflected in the Project Design

43. **The project design is informed by the government's implementation of several national SWM policies and programs, and particularly by lessons from implementing the IDA-financed MEMP.** That project closed in June 2016 and its Implementation Completion and Results Report was finished in parallel with preparation of the proposed project in April 2017. The report rated overall MEMP outcomes as moderately unsatisfactory. Several lessons from MEMP are particularly relevant for continued engagement in Maldives:

a) **Appropriate and straightforward institutional and implementation arrangements are critical for successful coordination and implementation.** Projects must be designed with sufficient flexibility for implementation arrangements to be modified to address unforeseen and exogenous factors.

b) **A complex project design must be matched by an appropriate funding envelope and implementation period**. Finding the right balance between an innovative integrated design and accurate budgetary estimates and practical implementation capacity requires sufficient time and analysis, especially in the unique geographical context of the Maldives Islands.

c) **Multipronged objectives can be difficult to achieve**. While it was conceptually desirable to integrate infrastructure-focused interventions (such as the RWMC) with demand-side interventions (to raise awareness and change behaviors) and management practices (the introduction of new technologies and waste management practices), such complexity can be difficult to coordinate and implement in one single project.

d) **Focus adequately on building the capacity of the targeted client**, especially in new and technically challenging sectors (establishing private-public partnerships), and particularly if they are critical for the long-term sustainability of the investment.

e) **Upfront analysis of geographical, technical, and local challenges is critical for smooth implementation.** The project preparation timeline should be sufficient for an adequate assessment of complexities and local challenges, especially for a project with high risks (environmental, technical, and financial).

f) **Sufficient attention should be paid to the softer elements of an infrastructure project of this kind,** including operationalizing island waste management systems, systematizing user fees, and promoting twinning arrangements that pair needs for capacity building with sources of the skills required for waste management systems.

g) **Close involvement of local and island communities,** their awareness of the project and its aims, and their ownership are necessary for a successful regional waste management system in the Maldives. This effort includes involvement of and coordination with other partners, such as non-governmental organizations (NGOs), local businesses, and the private resorts.

h) **An independent beneficiary survey needs to be undertaken** to gauge the impact of the project's components on different segments of the population and undertake course corrections as needed. A community-centered M&E strategy can lead to better bottom-up data generation and increased ownership of project messages and activities.

i) **SWM requires intensive stakeholder involvement**, including involvement with indirect beneficiaries, throughout the project cycle. Promoting a participatory process with all stakeholders, and offering a simple, effective, and functional grievance redress mechanism (GRM) with direct public awareness and access to information from the beginning of the process, is key to sustainable and effective waste management.

j) **Well-defined and quantitative monitoring indicators, directly associated with project components, are required.** A more systematic approach in designing and monitoring outcome indicators would have greatly facilitated more rigorous evaluation of MEMP's achievements.

44. **Design of the proposed project was also informed by other local and global lessons from the World Bank's experience with SWM, including:**

a) **Solid waste management systems operate as an integrated system.** The RWMC and IWMCs are mutually dependent. The absence of one part of the system renders the other ineffective at best. Because of the financing gap in MEMP, neither the IWMCs nor RWMC received adequate funding when they needed it most. The lesson for the proposed project is that because the system is an integrated one, all investments in the IWMCs and RWMC should be implemented in a coordinated timeframe. The proposed project has embedded opportunities to review the allocation of funds across the various parts of the system and make timely adjustments.

b) **Each component of the value chain within the integrated system from generation at source to final disposal needs to work for the entire system to work**. Starting with generation at source, a significant reduction in the use of plastic bottles can be only a medium-term goal, so in the short term at least, the current composition of the waste streams is expected to stay the same, which is an important factor for the consideration of downstream choices in technology and capacity. Island collection and transportation systems must be designed in consultation with communities and must respond to their needs and affordability criteria. Otherwise the system will simply not be used and will not work. The final disposal facility must be designed, installed, and operated in

a modular framework, so that cost overruns associated with excess operational capacity are avoided at all times.

c) **Finding a suitable technology and experienced operator for the RWMC is critically important.** The MEMP-financed RWMC at Vandhoo will be operated by WAMCO and will be its first experience with operating such a facility, even though WAMCO operates other waste sites in the country. WAMCO will receive extensive training under the proposed project to build its capacity to operate all of the country's planned RWMCs. The choice of technology will be based on thorough feasibility studies that will analyze the alternatives, taking into account engineering, technical, environmental, social, financial, and economic considerations.

d) **Tariff charges should promote financial sustainability of the system.** Given the high level of public debt, in the near future the government's ability to subsidize the operational costs of SWM systems throughout the country will become less certain, making it important to increase cost recovery. At the same time, it is unlikely that full cost recovery can be achieved, given that the geography of the Maldives imposes very high transportation costs. The project will support a study on tariffs and improved cost recovery, focusing on resorts and other businesses that have expressed willingness to pay more, provided the service is available.

e) **Implementation readiness for solid waste operations must be fairly advanced to avoid excessive delays and cost overruns.** In particular, sufficient time must be devoted to the upstream detailed analysis of the RWMC to ensure that a thorough, comprehensive assessment is undertaken, that all factors (including transportation costs) are factored into site selection, and that the most appropriate technology choices are made. The proposed project will finance detailed feasibility studies on the RWMC and IWMCs before any investment decisions are made.

45. **Improvements to the project design based on these lessons include:**

a) A framework approach will be used for the proposed new systems in Zones IV and V.

b) Composting will continue to be used on inhabited islands to significantly reduce volumes of waste that must be transported to the RWMC. There will be more flexibility with respect to the choice of composting method, however, based on the quantity and type of waste of each inhabited island and the availability of land. The choice will not be confined to the windrow/passive composting method used in MEMP.

c) The project will undertake a BPEO study and a detailed feasibility study to ensure that a combined technical, financial, social, and environmental underpinning informs the selection of the final disposal site and methodology.

IV. IMPLEMENTATION

A. Institutional and Implementation Arrangements

46. **Project institutional and implementation arrangements include** a Project Board as the main oversight body; a PMU within MEE, with overall responsibility for project implementation; and the Island Councils and WAMCO, with responsibility for operating the IWMCs and RWMC, respectively.

47. **A Project Board under the Chairpersonship of the Minister, Environment and Energy, will be established to provide oversight**. The Board will have participation from other relevant government entities, including but not limited to MoFT, the Ministry of Tourism, the Local Government Authority, and EPA, to mobilize sufficient high-level coordination to ensure timely decision making and avoid/minimize implementation delays. The Head of WMD will serve as ex-officio Secretary to the Board, with the PMU acting as the Secretariat.

48. **A dedicated PMU with requisite staffing has been created under the leadership of the Head of WMD to undertake day-to-day implementation activities under the project**. The PMU will support the Island Councils in the preparation and implementation of IWMPs with help from the Atoll Councils. It will also interact with other ministries—with Fisheries and Agriculture, for identifying suitable uninhabited islands; with Housing, for identifying sites for IWMCs where needed; and with MoFT and Tourism, for ensuring that resorts give preference to use of the regional center within Zones IV and V. The PMU will also coordinate with EPA to ensure that funding for the islands conforms to the regulatory requirements.

49. **Early in project preparation, the government decided not to use the existing MEMP PMU**. The government weighed this decision carefully, given its strategic objective to limit the number of PMUs operating in the country to an absolute minimum, balanced with the need to ensure adequate capacity to implement the proposed project. The Bank and the government worked closely to ensure that the new PMU arrangements for the proposed project align as closely as possible with the government's objective by bringing the new PMU under WMD in MEE, ensuring that PMU staff contracts and functions comply with civil service rules, and ensuring that decision making by the PMU is limited to project activities and commitments only, and does not run counter to the government's own broader decision-making authority.

50. **The PMU staff will comprise all required technical and managerial staff, including the project manager/coordinator and technical specialists to provide input on financial management, procurement, and safeguards.** A technical advisor/specialist with SWM experience in similar conditions will also be mobilized. Other expertise to be employed by the PMU includes a communication specialist and an M&E specialist. The Head, WMD, will be the ex-officio project director of the PMU and the key counterpart for the Bank. The PMU will be set up in the WMD in MEE and be responsible for the day-to-day project oversight functions. It will carry out project M&E as an integral part of project management.

51. **Apart from the investments identified to optimize operation of the Zone II RWMC constructed under MEMP, the proposed project follows a framework approach to implementation, as the final locations of the other waste management facilities to be financed will not be decided by appraisal.** Because the locations are not yet known, clear criteria have been established for them. WMD has also prepared guidelines for the development of IWMPs and shared them with the Island Councils to ensure streamlined treatment of each aspect of waste management. The process for identifying the location of the new RWMC will be guided by the BPEO study (see below). While the PMU will be responsible for the implementation of all project activities (including those for other stakeholders like the EPA), the Island Councils and WAMCO will operate IWMCs and the RWMC, respectively. To guide project implementation, a Project Operations Manual (POM)[6] has been prepared by the PMU.

B. Results Monitoring and Evaluation

52. **Monitoring and evaluation of outcomes and results are an integral part of the project design.** The PMU will collect and present data and reports for six-monthly reviews by the Project Board/Steering Committee in conjunction with World Bank implementation support missions, so that progress toward achieving the PDO is measured and corrective actions are identified in time as may be required. During implementation support missions, discussions related to institutional capacity building, financial viability, technical reviews, and site visits will also provide an effective means of monitoring progress. In addition, the Project Board will continuously monitor performance of the PMU itself, to avoid protracted delays due to a lack of proactivity by the PMU.

53. **The project will undertake two independent evaluations, through selected independent expert consultants**. One evaluation will take place prior to the first mid-term review (planned for 18 months after project effectiveness), and the other will occur 6 months prior to the closing of the project. These evaluations will be augmented by annual perception surveys of project beneficiaries with regard to user fees, environmental benefits, and reliability of SWM supported under the project.

54. **The PMU will have primary responsibility for M&E of the PDO-level and intermediate results indicators**. To this end, an M&E specialist will be hired full time by the PMU and will be responsible for working closely with the participating Island and Atoll Councils that will generate the primary data at source and submit the periodic reports. The proposed project will finance the necessary equipment (such as weigh bridges and stations), management information systems, and training to generate and manage the required data and produce the required reports. *The Results Framework can be found in Annex 1.* All efforts will be made to integrate the project's M&E arrangements with the existing M&E systems under MEMP. Adequate project funds have been allocated under Component 4 for the M&E activities during implementation.

[6] In addition to detailing project implementation, fiduciary, and safeguard requirements and procedures, the POM includes the terms of reference (ToRs) for the feasibility studies, guidance on preparation of IWMPs, and criteria for readiness of IWMCs, among other information.

C. Sustainability

55. **Solid waste is a serious environmental and public health issue, adversely impacting the broader economy.** In line with central and local government priorities, the proposed project will support and facilitate the achievement of key Maldives development priorities, which explicitly require the improvement of SWM and development of a circular economy featuring waste reduction, reuse, and recycling. The project is also aligned with the updated National Solid Waste Management Policy of 2015, the Draft Waste Management Act, and the Waste Management Regulation of 2014. The President of Maldives, has made SWM one of the top two national development priorities.

56. **Managing solid waste is typically costly, and it is even costlier in the geography of the Maldives where economies of scale are small.** To ensure that the drivers affecting the financial sustainability of the SWM systems are analyzed and understood, the proposed project is financing user fee and tariff studies to determine a suitable user fee structure and regime. Also, the framework approach adopted by the project will ensure that choices related to location, capacity, and technology are informed by detailed feasibility studies that include a thorough financial and economic analysis.

57. **To fully realize the objective of the government policy (which is for the sector to be sustainable), the government will still be expected to provide some level of subsidy to meet the O&M costs that remain for the system after households, resorts, and other businesses pay a user fee**. The proposed detailed feasibility studies for the investments in Zone IV and V will include a comprehensive financial and economic analysis to advise the government on the subsidies it will have to pay over the lifetime of the selected investments. Overall, there is significant willingness on the part of island communities and resorts to pay fees at an appropriate level for effective management of their solid waste. The government is committed to providing the subsidies necessary to operate and maintain the investments and has indicated its willingness to explore and identify potential public-private partnership in the long term.

D. Role of Partners

58. **The financial resources required to address the country's SWM crisis surpass US$190 million, which is well beyond the capacity of the government and individual development partners to provide in the short to medium term.** In response, the government has prioritized the immediate needs and has strategically divided regions of the country based on the National Waste Management Policy. MEE is working with various development partners to roll out the RWMC and IWMC approach in each of the seven zones to cover the entire country. While the proposed project will be funded only by IDA, the government's plans are summarized in Table 3.

Table 3: Waste management initiatives across the zones

Zone	Atolls (cities) included	No. of islands, cities	RWMC provision	Funding support source	Indicative amount (US$ million)
I	Haa Alifu, Haa Dhaalu, and Shaviyani	41	Transfer station currently being designed	OPEC† Fund for International Development (OFID) and GoM	9.20
II	Noonu, Raa, Baa, and Lhaviyani	45	Vandhoo created; will initially serve Zone I in addition to Zone II	IDA	16.45 under MEMP + proposed MCEP project.
III	Kaafu, Malé City (inclusive of Hulhumale and Villimale), Alifu, Alifu Dhaalu, Vaavu	32 islands, 1 city	Transfer station in Malé; treatment and disposal in Thilafushi	Asian Development Bank (ADB), Asia Infrastructure Investment Bank (AIIB), others being identified	126.00
IV	Meemu, Faafu, and Dhaalu	19	Combined RWMC to be finalized following feasibility study to be supported under the proposed project.	IDA	17.50‡
V	Thaa and Laamu	23		IDA + GoDenmark†† (LECReD)	
VI	Gaafu Alifu, Gaafu Dhaalu, Fuvahmulah City, and Addu City	18, 2 cities	Combined treatment and disposal in Addu	GoM	10.00
VII	Addu	6 wards	Small-scale waste to energy	Abu Dhabi Fund for Development (ADFD) / The International Renewable Energy Agency (IRENA)	6.00
				GoM	5.36

† Organization of Petroleum Exporting Countries.
‡ Part of US$17.5 m will also finance operationalizing Zone II systems, consistent with project components and cost tables.
†† LECReD is *not* co-financing the proposed project. LECReD is ongoing at the time of preparation of the proposed project and is financing investments on Laamu Atoll only. IDA will finance activities on Dhaalu, Faafu, Meemu, and Thaa Atolls.

V. KEY RISKS

A. Overall Risk Rating and Explanation of Key Risks

59. Table 4 summarizes risk categories and ratings for the proposed project.

Table 4: Risk categories and ratings for the proposed Maldives Clean Environment Project

Risk category	Rating
Political and governance	Substantial
Macroeconomic	High
Sector strategies and policies	Moderate
Technical design of project	Substantial
Institutional capacity for implementation and sustainability	High
Fiduciary	Moderate
Environment and social	High
Stakeholders	Substantial
Other	Moderate
Overall	**High**

60. **Political and governance risk is substantial and macroeconomic risk is high, as analyzed in the recent Systematic Country Diagnostic (September 2015).** Maldives is highly vulnerable to macroeconomic shocks due to its small size, lack of economic diversification outside tourism, and heavy reliance on imports. As noted, in recent years an increasing share of revenue has come from tourism, while an increasing share of expenditure has gone to massive infrastructure projects that have driven the country's debt to unsustainable levels. The transition to a democratic system is still in progress, and powers and relationships among democratic institutions remain to be settled.

61. **Technical design risks are rated substantial**. Lessons from MEMP have dictated a simple project design for the proposed project, predominantly attained by striking a better balance between "soft" (technical assistance studies) and "hard" (physical investments) activities in a framework approach. This approach offers flexibility to make strategic decisions at two mid-term reviews, based on comprehensive feasibility design and safeguard studies. The inherent risks of a framework approach still remain, however; they include potential cost overruns and implementation delays. Costs will be evaluated again and financing reallocated at the mid-term reviews. Implementation delays (mostly due to procurement delays) are to be minimized by adopting simpler procurement packages, informed by better knowledge (derived from MEMP) of market conditions particular to the Maldives.

62. **Risks related to institutional capacity for implementation and sustainability are currently assessed as high.** While the recently completed Bank-financed MEMP and the projects funded by the Climate Change Trust Fund have created some capacity for SWM in the Maldives, a considerable need remains

to develop a robust human resource and infrastructure capacity for SWM. The risk is mitigated in part by strengthening capacity built through MEMP, incorporating lessons from MEMP, and transferring experienced staff to the new PMU. The user fee and tariff studies (Sub-component 1.1) and feasibility studies (Sub-component 1.2) will also advise MEE on the levels of user fees and subsidies required to ensure financial subsidies.

63. **Fiduciary (financial management and procurement) risks are both rated moderate**. MEE as the overall implementing agency is well versed in managing Bank-financed operations and familiar with all fiduciary procedures and requirements related to World Bank projects. The PMU for the proposed project is new, however. It has been created under the WMD of MEE, and the FM staff identified for the PMU have no prior experience in handling a World Bank or major donor-funded operation. Significant hand-holding support and opportunities for capacity building will be provided, especially in the initial years of the project.

64. Public procurement in the Maldives is carried out under the relevant Financial Rules Chapters. However, the Financial Act does not elaborate the remit of procurement rules on all entities. State-owned enterprises are not covered by the Procurement Rules and generally are not subject to central government controls, even though a significant amount of procurement is undertaken through them. As the project will also be the first to implement the World Bank's new Procurement Framework, it will be entering unfamiliar territory and will require close support from the Bank's fiduciary team to ensure that procurement functions smoothly. Experience with previous projects has highlighted the implementation risks related to the prevailing challenging market for goods, work, and services in Maldives. Innovative solutions must be sought to attract the market to participate in project-related bidding opportunities. Procurement performance will be reviewed during implementation to allow the procurement risk rating to be adjusted accordingly.

65. **Environmental risk is rated high.** While the project is classified as Environmental Category A, it is expected to bring positive environmental benefits to project areas by establishing sound SWM systems in the target zones. Activities supported by the proposed project will help to curtail the major impacts associated with improper waste management. Any potential risks associated with the operation of SWM facilities and final disposal of solid waste will be handled in line with the ESAMF and Environmental and Social Management Plan (ESMP). The uncertainty regarding the location of certain physical investments under the project, such as the new regional facility, poses additional risks that need to be appropriately managed through the proposed ESIAs and BPEO study.

66. **Stakeholders' risk is rated substantial.** Coordination among stakeholders continues to be a challenge, owing to the multiple agencies that have been set up in recent years, changes to the mandates of some institutions, and numerous legislative changes related to SWM. Coordination within different departments and institutions within MEE has improved now that weekly meetings take place. Even so, poor coordination and sharing of information between ministries such as MoFT, MEE, and Tourism results in a duplication of effort, limited cost-effectiveness, and a lack of confidence to deliver their respective mandates. Therefore, a **Project Board** to be chaired by the Minister of MEE will be

established to coordinate across agencies and provide oversight of the PMU. Other factors to consider include the growing gap between aspirations and opportunities for socio-economic inclusion, which has fostered a sense of disenfranchisement among some Maldivians, especially youth. Increasing distortions on the labor market add to stakeholder risks.

67. **Climate risk mitigation measures.** The Climate Change and Disaster Screening undertaken during preparation indicates that the project is likely to be exposed to several climatic and geophysical hazards by virtue of its location. In particular, proximity to the sea increases vulnerability to tsunamis and rising sea levels, which may affect project activities. Extreme precipitation and flooding are also a high risk. Strong winds or extreme temperatures are moderate risks. Some of these risks will be addressed during the preparation phase by factoring revised estimates of precipitation into facility design. Training operational staff to handle situations arising after extreme events may need to be considered. In summary, the impact of climate risk on project activities such as the provision of physical infrastructure, plant, and equipment is potentially high. Some mitigation measures, including appropriate handling and treatment (composting) of solid waste, will reduce uncontrolled anaerobic degradation and consequent methane generation from putrescible wastes.

68. Overall, the non-physical components slightly reduce the impact to which solid waste as a sector is exposed in the Maldives. But the understanding of climate change impacts and exposure to geophysical hazards for SWM in Maldives is not well developed and will need to be monitored in this development context based on the actual operation of the sites. Specific project mitigation measures include protecting infrastructure financed by the proposed project by making it structurally cyclone proof, and it should have good drainage systems. The rising sea level will likely be a long-term issue, but already there is evidence of severe coastal erosion in some islands, so sea protection measures will be included in the design of infrastructure as well. For example, existing structures closer to the sea will be protected or relocated if needed, and new structures will be located only in areas protected from the rising sea level and coastal erosion.

APPRAISAL SUMMARY

A. Economic and Financial Analysis

69. **The proposed project will benefit Maldivian society by reducing public health risks as well as marine and coastal degradation (which in turn affect tourism and fisheries).** The economic analysis of MEMP, which supported similar activities to improve waste management, showed in quantitative terms that these investments are economically feasible, and the same considerations largely apply to the proposed project. More specifically, the benefits will include (among others): (a) reduced health risks to residents and tourists from waste accumulation and open burning of waste; (b) reduced ocean pollution, notably with plastics, which harms marine ecosystems and livelihoods based on fisheries; and (c) reduced coastal degradation, including of coral reefs, from waste dumping in the ocean. Coastal degradation manifests itself in the form of littered beaches and coastal waters, which are a

critical liability for tourism, and damaged coral reefs, which then cannot provide crucial services such as the protection of juvenile fish, protection against floods, and recreation for tourists. Additional benefits will also include the generation of compost to contribute to the development of soil fertility and agriculture on the islands and contribute to food security.

70. **The framework approach adopted by the proposed project means that the location and design of the physical investments in Zones IV and V will not be known until the necessary studies are complete; only the physical investments required to complete the remaining MEMP (Zone II) activities are identified.** For that reason, the financial and economic analysis focuses on investments under the proposed project to operationalize the SWM system in Zone II. The large economic benefits associated with the SWM system supported by MEMP and the proposed project will not materialize unless the system is sustainably operated, so this analysis explores the conditions under which associated recurrent costs could be covered at the IWMC and RWMC levels.

71. **At the IWMC level, the analysis shows that the service fees required for cost recovery exceed the current fees collected**. For example, excluding collection costs, operating an IWMC, including composting, sorting, and baling of plastics, would require a service fee of MVR158[7] per month per household on average; the current practice is to collect MVR100–140[8], including for regular collection. There appears to be no room for Island Councils to contribute toward the cost of transporting the segregated inorganic waste to the RWMC. In other words, these costs will need to be subsidized by the government and/or resorts. Leaving Island Councils with sufficient financial resources to effectively collect and segregate their waste may be a wise decision, contributing to maximum removal of inorganic wastes from the islands.

72. **At the RMWC level, the level of segregation of waste at source into organic compostable and inorganic wastes has an important bearing on the operational cost of the system.** If all islands and resorts were to segregate 100%, the total amount of inorganic waste transferred to and processed at Vandhoo RWMC would amount to some 2,561 t per month. The cost would be about MVR2.6 million per month, of which about 17% would be the resorts' share, or about MVR89 per bed per month. However, 100% segregation is a long-term target. Its achievement requires significant behavioral change among waste generators, institutional capacity building among local institutions, and a strong monitoring and enforcement program. To capture the evolution of the system over time, the analysis added three scenarios with a 25%, 50%, and 75% average segregation of waste at source.

73. **Given the significant uncertainties in the system, this analysis does not recommend a specific level of service fee for the resorts or a level of government subsidy**. It recommends instead a scheme of fees, subsidies, and penalties to provide incentives for reaching the SWM system's targets. Specifically, the government may consider a flat fee per bed for resorts, covering at a minimum the

[7] World Bank Project team analysis

[8] Island Councils in Zones 4 and 5

resorts' share of the RWMC operating costs, transportation, site operations, and monitoring and enforcement. The remainder of the costs would be covered through a government subsidy. At the same time, stiff penalties would need to be imposed on non-segregation, and in particular against illegal dumping and burning of waste. The penalties would be backed by a strong monitoring system. Rewards for compliant islands and resorts would provide additional incentives. The planned feasibility study and stakeholder consultations will help the government determine the optimal levels of fees, penalties, and rewards.

74. **Finally, financial sustainability depends on more than the new SWM investments discussed above.** It also depends on the introduction of new policies such as extended producer responsibility to involve producers and importers in safe end of life management of their products, and corporate social responsibility for large-scale users such as the resorts.

B. Technical

75. **The technical design and approach of the proposed project is aligned with national policy and programs to design, install, operate, and maintain an integrated waste management system using a regionalized concept.** The integrated system consists of one RWMC serving a number of IWMCs in a defined geographic region/zone. Each inhabited island in a defined zone will have one IWMC located on it, to which collected waste generated at the household level and other island waste is transported. The IWMC is where all island waste is initially collected, processed, and sorted into two streams (organic and inorganic waste). Since transportation costs are the highest costs of operating the regional system, organic waste will be treated and disposed of at the IWMC, predominantly through composting, to prevent transporting waste of the island, reduce waste volumes, and ultimately reduce costs of transporting waste to the RWMC.

76. **At the IWMC, only inorganic waste will be processed and made ready for shipping off the island to the RWMC, where the final disposal facility is located.** In theory, all waste arriving at the RWMC should be inorganic and ready for final disposal. Purpose-built vessels will transport the residual waste from the islands to the RWMC at regular intervals. Their size and routes will be optimized based on results of the feasibility study. In addition to the inorganics, the RWMC will also be designed to receive hazardous medical, industrial, electronic, and bulk wastes. There will be one RWMC per defined zone, with the possibility of two or more neighboring zones sharing one RWMC where it is efficient and more cost effective to do so.

77. **Appropriate technologies for waste management will be selected based on results of the feasibility study and lessons from experiences in Maldives and small countries/island states with similar waste management challenges.** IWMCs will primarily adopt low-cost composting technology that is readily and easily operated and maintained and meets stringent environmental and social standards prescribed in the ESAMF. Household waste will be collected using wheelbarrows or tricycles for smaller islands with small populations and truck loaders for larger islands and populations. IWMCs will typically have a reception area to ensure that the waste is properly segregated into the two

streams for the respective treatments. The exact technology and size of the plant and operation at the RWMC remains to be determined by the detailed feasibility study, which will evaluate alternatives based on maximum volume reduction, waste to energy potential and demand, minimum residue volumes, optimum costs, and characteristics and availability of the inorganic waste streams, among other criteria.

78. **An SWM system offers the most value when it has the longest life in terms of its capacity to operate; the design norm is a modular expansion approach with a potential duration of 30–50 years.** This is particularly important for Maldives, given that land is at a premium. Therefore, the project will also finance studies and strategies to look at waste reduction, recycling, and reusing. Additionally, the proposed project will finance measures to reduce the use of plastic water bottles, particularly at the household level. When this approach is fully effective (allowing attitudinal, cultural, and personal lifestyle choices, preferences, and consumption patterns to evolve), it will substantially reduce the use of plastic bottles and sea dumping of plastics.

C. Financial Management

79. **The proposed Financial Management (FM) arrangements are in line with the fiduciary requirements of OP10.00.** An FM assessment of MEE was done in consultation with the FM focal point identified for the PMU. MEE as an agency is well versed in all World Bank fiduciary procedures and requirements for Bank-financed operations. A PMU with dedicated FM staff will be established under WMD of MEE. As this PMU is a new unit, the FM staff identified for the PMU has no prior experience in managing operations funded by the Bank or other major donors. Based on these considerations, the FM risk is assessed as **moderate.** Training and other capacity building will be provided to relevant staff, especially during the initial years of the project.

80. **The PMU on behalf of MEE will be responsible for the overall FM arrangements for the proposed project.** MoFT will authorize payments upon submission of appropriate documentation by the PMU. No funds will be transferred to any other agencies. The finance officer assigned by MEE for the project in the PMU will have oversight responsibility for implementing FM arrangements. The proposed FM arrangements are found to be adequate. There are no overdue audit reports or ineligible expenditures under MEE.

81. **After the Financing Agreement is signed, the PMU with MoFT approval will open a dedicated Designated Account (DA) in US dollars with the Maldives Monetary Authority (the Central Bank of Maldives) to receive IDA funds.** Disbursements will be report-based and an initial advance will be deposited into the dedicated DA. Thereafter, withdrawals from the DA will be made on the basis of the six-monthly forecasts in the quarterly Interim Unaudited Financial Reports (IUFRs) for the project. IUFRs for the project will be prepared by the PMU/MoFT. Quarterly IUFRs must be submitted by the PMU to IDA within 45 days following the end of each quarter. The project will undergo regular internal audits and internal audit reports will be shared with the Bank. Financial statements of the project will be prepared by the PMU and audited annually by the Auditor General's Office of Maldives. These

audited financial statements, together with the auditor's report, will be submitted to the Bank within six months of the end of the fiscal year. *Annex 3 provides additional detail on FM.*

D. Procurement

82. **The PMU will carry out procurement for the project under the Procurement Regulations for IPF Borrowers 2016, rolled out under the Bank's new Procurement Framework**. This setup offers a unique opportunity to provide innovative solutions to potentially complex procurement issues. Under this mechanism, the procurement specialist will be responsible for procurement related to the various disciplines and specializations involved in the project. Procurement will include equipment to fully operationalize the SWM system in Zone II; equipment and vehicles for collection and transportation, island organic waste treatment facilities, island inorganic waste separation and baling facilities; 43 IWMCs; a treatment unit and ancillary facilities at the RWMC, based on a potential Design-Build-Operate contract following the recommendations of the feasibility study (under Sub-component 1.2); and staff and consultants to manage the functions of the PMU in Zone IV. Procurement risk is rated **moderate**. *The procurement procedures are clearly identified in a procurement chapter of the POM that has been appraised and reviewed by the Bank. In consultation with the Bank, the POM will be reviewed regularly and updated to meet project needs.*

E. Social (including Safeguards)

83. **The project does not envisage any significant adverse social impacts**. Even so, the construction and expansion of IWMCs could lead to involuntary losses of crops and land, because a small percentage of communities rely on the surrounding area for agriculture and their livelihood. A resettlement policy framework (RPF) has been prepared as part of the ESAMF in line with OP4.12 (Involuntary Resettlement). The participatory and consultative process involved in the development and implementation of IWMPs is likely to have a positive impact on the island communities. The project will ensure sustainability of interventions through meaningful participation and engagement of local communities, which will be emphasized via interventions such as: (a) public awareness and communication campaigns; (b) mobilization of local communities (particularly women); (c) transparent consultations; and (d) dissemination of project information.

84. **An ESAMF has been developed for the project to minimize adverse impacts.** The ESAMF includes a process for screening project activities, guidelines for assessing adverse impacts, development of an entitlement framework and mitigating of social risks, and guidance for preparing a Resettlement Action Plan, if required. As part of the ESAMF, a Gender Development Framework (GDF) has been developed to help analyze gender issues during preparation and implementation and to design interventions to address women's needs. Gender analysis will be part of the intervention-specific Social Assessments for the IWMCs and RWMC. An environmental and social (E&S) safeguards coordinator in the PMU, with support from E&S officers on each of the islands/atolls, will be responsible for managing the project's safeguard requirements, such as overseeing implementation of social management plans and grievance mechanisms; liaising with other agencies, contractors, and

engineering supervisors at the island level; M&E; and training. Both the PMU and Island Councils (ICs) will establish a grievance mechanism to receive and facilitate resolution of concerns by the affected communities about the implementing agency's environmental and social performance during project implementation. All respective ESMPs will establish a mechanism that is readily accessible to all segments of the affected communities to address concerns promptly, at no cost and without retribution as outlined in the project ESAMF. The following community-based goals are meant to aid the GRM: communications, gender, and citizen engagement.

Communications

85. **Public awareness and community participation in SWM is critical for achieving maximum waste recovery through composting, reuse, and recycling**. The regional communication strategy proposed by the government to mobilize communities to segregate waste may be used as a backdrop for a waste education and awareness strategy at the island level. The strategy is to effectively engage and empower women, youth groups, and children through awareness and education programs on general environmental awareness and waste management. Activities such as strengthening school environment clubs and providing teaching aids to teachers could be considered, among others.

Gender

86. **The proposed project will serve as a stepping-stone for enhancing gender equality through greater empowerment and engagement of women at the project level consistent with the GDF.** The Women's Development Committees (WDCs) on the islands have the potential to engage in activities focusing on awareness programs at schools on the effects of hazardous waste and the development of micro-enterprises for example, through recycling. Specific responsibilities and activities for WDC members will be identified and outlined to encourage their thorough involvement in improving waste collection and disposal for their island communities. Well-functioning WDCs on some islands could serve as a local source of inspiration through community-based learning. This arrangement would provide an opportunity for women to engage effectively in the decision-making process for setting up new IWMCs or improving those already in operation. To ensure that women's participation and satisfaction as beneficiaries is measured, the Results Framework includes an indicator on beneficiary satisfaction, disaggregated by gender. This indicator will measure progress towards bridging the gender gap as identified in the GDF by measuring the women who are satisfied with their access to solid waste services, including its benefits and reliability. The results will be fed back into the intervention-specific Social Assessments for the IWMCs and RWMCs in order to better design interventions to address the concerns raised by women.

Citizen engagement

87. **The proposed project is designed to include three mechanisms for citizen engagement: (1) community consultations throughout implementation, including consultations during the preparation of the feasibility studies and ESIAs; (2) GRMs functioning at the Island Council level; and (3) monitoring of safeguards management by the E&S coordinator, which will involve discussions with different types of stakeholders.** Citizen engagement will also involve the PMU

conducting community meetings at each participating island during and after IWMC construction to get beneficiary feedback. The Results Framework includes a PDO-level indicator—"share of target beneficiaries with rating 'satisfied' or above with application of the SWM approach (user fees, environmental benefits, reliability) (disaggregated by sex)"—to ensure that concerns from communities are heard and addressed. The outcome of these citizen engagement exercises will be used by MEE in implementing the project, and actions taken will be communicated to the beneficiaries. These outcomes and actions will also be documented and reviewed during implementation support missions.

88. **The proposed project explicitly seeks to support engagement of stakeholders and beneficiaries through consultative processes, engagement in local-level planning, and feedback mechanisms to develop and adjust the integrated SWM approach and access to services, thus contributing to sustainability and the achievement of project outcomes**. Feedback mechanisms will be developed to ensure transparency, accountability, and learning as well as continuous dialogue with beneficiaries and other stakeholders at the local level. Particular attention will be given to the capacity of WAMCO and the Island Councils to close the feedback loop and report on action taken in this regard.

89. **The specific elements of the framework for citizen engagement include**: (a) support to engage island communities and councils in the development of planning instruments at large, including budgeting and monitoring; (b) support for community engagement in determining IWMC-based investments and establishing service standards, including proposed payment of user fees; (c) support for designing a feedback mechanism for beneficiaries and other stakeholders at the island level to express concerns and questions and have them resolved within stipulated service standards (to be monitored in the Results Framework); and (d) support for specific independent monitoring of project activities three times during implementation(in the first year, at mid-term, and at completion) to ensure transparency and feedback on these activities. The elements, mechanisms, and protocol for this citizen engagement framework (outlined in Table 5) will be detailed in the POM. The quality of its implementation and progress will be monitored at the national and island levels through supervision and dialogue with the PMU, WAMCO, and Island Councils.

Table 5: Feedback framework for citizen engagement

Contribution to PDO (to improve SWM in selected zones)	Related citizen engagement activity	Citizen engagement results and approach to management
PDO is supported by citizen engagement as: (1) An integrative tool for social accountability toward communities across the targeted islands (proof of concept: island approach) (2) As a means to provide a voice and engage with local actors and ultimate	(a) Feedback mechanism across selected zones and islands (independent monitoring) and closing of the feedback loop through forums for engagement (focus group discussions)	Share of target beneficiaries with rating "satisfied" or above with application of the SWM approach (user fees, environmental benefits, reliability) (disaggregated by sex)

beneficiaries to ensure that local and island institutional capacity in planning and implementation and local improvements respond to local problems, demands, and needs (3) Delivery mechanism	(b) Capacity building of WAMCO and the PMU and delivery of interventions to take account of feedback	Data source: Field-based perception survey based on a sample in the selected zones, implemented by a third party

F. Environment (including Safeguards)

90. **The project is categorized as an Environmental Category A, predominantly because it involves activities with significant environmental implications: the construction/upgrading of SWM facilities, management of existing disposal sites and on-site treatment, and management and final disposal of solid waste in proposed facilities, including the possible construction of a new RWMC under Sub-component 2.2.** At the same time, the project is expected to bring positive environmental benefits overall to the project regions by establishing a sound SWM system there. While the project activities will help to reduce major impacts associated with improper management of solid waste, significant risks are associated with the establishment and operation of SWM treatment facilities and the final disposal of solid waste, and they need to be managed according to the project ESAMF and ESMPs. In addition, the exact location of a number of physical investments to be supported under Components 2 and 3 are not yet known.

91. **The proposed project triggers the following environmental safeguard policies:**

- **OP 4.01 (Environmental Assessment)** is triggered to ensure that any environmental impacts associated with project activities are identified in time and mitigated.
- **OP 4.04 (Natural Habitats)** is triggered because all of the country's islands are surrounded by coral reefs, which are significant natural habitats. The project will not conduct any activities within designated protected areas, and project interventions will help to mitigate pollution and degradation of these ecosystems caused by inappropriate SWM.

92. **Activities in Zone II under Sub-components 2.1 and 3.1 are covered by the full ESIA that was previously completed for MEMP and cleared by IDA**. These same safeguard instruments, which include ESMPs for each respective IWMC in the MEMP region, will remain valid for further investments associated with these facilities under the proposed project, while monitoring and reporting will be conducted in line with the measures outlined in the ESAMF described below.

93. **Apart from the activities in Zone II described earlier, the specific details of the other physical investments to be financed, including the location of the potential new RWMC and interventions in participating islands of Zones IV and V, cannot be determined prior to the detailed assessments and studies that will be supported by the proposed project.** As detailed site-specific Environmental and Social Assessments cannot be carried out during project preparation, an ESAMF has been prepared in

compliance with OP4.01, World Bank Environmental Health and Safety Guidelines, and national environmental legislation. The ESAMF includes protocols for screening project activities, guidelines for mitigating environmental and social risks, and guidance on developing ESIAs and ESMPs. It also specifies a plan for providing basic training on using the screening protocols and mitigation guidelines.

94. **The cost of implementing ESMPs is integrated into the project budget, and the project will ensure that all works contracts include the ESMPs and that the cost of implementing the ESMPs is identified as an item in the Bill of Quantities**. Due diligence measures focusing on the proposed new RWMC will include a standalone ESIA for the proposed site and technology identified through the feasibility and BPEO studies conducted by the project. The PMU will second/hire environmental specialists to focus on the tasks and responsibilities outlined in the ESAMF in the role of an E&S coordinator. While the ESAMF will also cover the MEMP area of Zone II, all relevant standalone ESIAs and ESMPs prepared for MEMP activities will be applicable to this proposed project and will be adhered to continuously.

95. **Consultations with key stakeholders, including atoll/Island Councils within the project zones, were held on November 17–19, 2016 to inform stakeholders as well as project-affected people of the proposed activities, environmental risks, and mitigation measures, including the GRM.** The consultation discussions and stakeholders' opinions and suggestions were documented as part of the ESAMF. The final ESAMF was disclosed again in-country on February 1, 2017. The executive summary of the ESAMF has been translated into Divehi, and a hard copy of the translated version will be placed in all Island Council offices. The ESAMF was also disclosed on the InfoShop website on February 1, 2017. A three-tiered GRM, involving the Island Councils, MEE, and Department of Justice, has also been established for community members.

G. Other Safeguard Policies (if applicable)

H. World Bank Grievance Redress

96. **Communities and individuals who believe that they are adversely affected by a World Bank–supported project may submit complaints to existing project-level grievance redress mechanisms or the World Bank's Grievance Redress Service (GRS).** The GRS ensures that complaints received are promptly reviewed in order to address project-related concerns. Project-affected communities and individuals may submit their complaint to the Bank's independent Inspection Panel, which determines whether harm occurred, or could occur, as a result of World Bank non-compliance with its policies and procedures. Complaints may be submitted at any time after concerns have been brought directly to the World Bank's attention, and Bank Management has been given an opportunity to respond. For information on how to submit complaints to the GRS, see *http://www.worldbank.org/en/projects-operations/products-and-services/grievance-redress-service*. For information on how to submit complaints to the World Bank Inspection Panel, see www.inspectionpanel.org.

Annex 1: Results Framework and Monitoring

Results Framework
COUNTRY : Maldives
Maldives Clean Environment Project

Project Development Objectives

The Project Development Objective is to improve solid waste management in selected zones.

Project Development Objective Indicators

Indicator Name	Core	Unit of Measure	Baseline	End Target	Frequency	Data Source/Methodology	Responsibility for Data Collection
Name: Waste Management Center (RWMC) operational		Number	0.00	1.00	Semi-annually	Review and validation of weigh bridge and IC shipping log data to determine operation of RWMC	PMU, WAMCO and ICs

Indicator Name	Core	Unit of Measure	Baseline	End Target	Frequency	Data Source/Methodology	Responsibility for Data Collection
Description: The RWMC is the final disposal facility to be created by the project to receive inorganic and non-compostable organic waste, collected and processed by a group of islands sharing the RWMC facility. RWMC will be considered operational when it can service at least 10 islands and has a minimum operational capacity of 15m3. This indicator has annual targets.							
Name: Share of total waste in selected zones collected by the IWMCs (disaggregated by inorganic and organic waste)		Percentage	0.00	50.00	Semi-annually	Review and validation of weigh station data from IWMC to determine share of waste collected.	PMU and ICs
Description: This indicator is to measure the share of the waste collected at the islands level. This will be measured and reported separately for each participating island. This indicator has annual targets.							
Name: Share of the organic waste in selected zones treated in IWMCs		Percentage	0.00	50.00	Semi-annually	Review and validation of production data from IWMC to determine share of organic waste treated.	PMU and ICs
Description: This indicator measures the share of organic waste to be composted at the IWMCs. It is to be measured and reported separately for each participating island. This indicator has annual targets.							

Indicator Name	Core	Unit of Measure	Baseline	End Target	Frequency	Data Source/Methodology	Responsibility for Data Collection
Name: Share of inorganic waste in selected zones stored and transported to RWMCs		Percentage	0.00	50.00	Semi-annually	Weigh bridge and production data collected and compiled at the IWMCs and RWMC	PMU, WAMCO and ICs
Description: This indicator seeks to measure the share of inorganic waste processed by the IWMCs and transported to the RWMC							
Name: Share of target beneficiaries with rating 'satisfied' or above with application of the solid waste management approach (user fees, environmental benefits, reliability) (disaggregated by sex)		Percentage	0.00	75.00	One prior to the mid-term review of the project, and another six months prior to closing of the project.	Perception survey on sample basis by third party.	PMU , WAMCO and IC through use of independent monitors.
Description: This indicator measures beneficiary satisfaction and has annual targets.							

Intermediate Results Indicators

Indicator Name	Core	Unit of Measure	Baseline	End Target	Frequency	Data Source/Methodology	Responsibility for Data Collection
Name: Island Waste Management Centers Established		Number	0.00	15.00	Semi-annually	Review and validation of procurement and site inspection records to determine established IWMCs.	ICs and PMU
Description: IWMCs may contain some or all of the following: collection and transportation equipment and vehicles, organic waste treatment facilities, inorganic waste separation facilities, and bailing equipment. In each island the approved Island Waste Management Plan (IWMP) will specify what the IWMC is to contain. So, an IWMC will be considered "established" when it is consistent with the IWMP. This indicator has cumulative targets.							
Name: Coverage of O&M expenditures of RWMC from user fees		Percentage	0.00	50.00	Monthly	Review and validation of project financial records and accounts to determine coverage of O and M expenditures of RWMC from user fees. .	PMU and WAMCO
Description: Users include islands and resorts. This indicator has annual targets.							

Indicator Name	Core	Unit of Measure	Baseline	End Target	Frequency	Data Source/Methodology	Responsibility for Data Collection
Name: Vehicles provided to selected IWMCs to complete the integrated waste management systems		Number	0.00	15.00	Semi-annually	Review and validation of procurement and contract records including signed delivery notices to determine delivery of vehicles at the IWMCs	PMU and ICs
Description: This indicator measures the procurements made by the project in Zone II that could not be made under MEMP but are necessary for the proper implementation of the integrated waste management system in that zone. Thus, the baseline is the number of pieces of equipment and vehicles procured under MEMP and the target is the total number of procured items under MEMP + MCEP (Zone II) delivered to IWMCs. The indicator includes collection, transportation, composting and bailing equipment and vehicles for the participating islands. This indicator has cumulative targets.							
Name: Organic waste treated in IWMCs put to productive use (composting)		Percentage	0.00	50.00	Monthly	Review and validation of compost production records to determine organic waste treated.	PMU and ICs
Description: This indicator will be measured for each of the participating islands. It measures the percentage of compost generated on IWMCs that is sold or given away to an end user. This summary table will report an average figure over all participating islands. This indicator has annual targets.							

Indicator Name	Core	Unit of Measure	Baseline	End Target	Frequency	Data Source/Methodology	Responsibility for Data Collection
Name: Waste disposal capacity at Island Waste Management Centers (IWMCs) created under the project		Metric ton	0.00	150.00	monthly	Review and validation of weigh bridge and production data to determine capacity created at the IWMCs.	ICs and PMU
Description: This indicator measures the cumulative capacity of waste management centers created on the islands by the project. This indicator has cumulative targets.							
Name: Policy on solid waste minimization drafted		Yes/No	N	Y	Once during life of the project	Review of draft policy on solid waste minimization.	PMU and WMD
Description: This indicator is there to measure progress towards putting in place a waste minimization policy that would yield to really results on the ground with respect to reduction in the use of plastic bottles in particular.							
Name: Waste disposal capacity at Regional Waste Management Center (RWMC) created under the project		Metric ton	0.00	150.00	Semi-annually	Review and validation of weigh bridge and plant room data to determine disposal capacity created at the RWMC.	PMU and WAMCO

Indicator Name	Core	Unit of Measure	Baseline	End Target	Frequency	Data Source/Methodology	Responsibility for Data Collection
Description: The RWMC is the final disposal facility to be created by the project to receive inorganic and non-compostable organic waste, collected and processed by a group of islands sharing the RWMC facility. This indicator seeks to measure the capacity of the RWMC. It is to be measured separately for each participating islands. Weighing is done at the islands and confirmed at the RWMC. This indicator has cumulative targets.							

Target Values

Project Development Objective Indicators

Indicator Name	End Target
Waste Management Center (RWMC) operational	1.00
Share of total waste in selected zones collected by the IWMCs (disaggregated by inorganic and organic waste)	50.00
Share of the organic waste in selected zones treated in IWMCs	50.00
Share of inorganic waste in selected zones stored and transported to RWMCs	50.00
Share of target beneficiaries with rating 'satisfied' or above with application of the solid waste management approach (user fees, environmental benefits, reliability) (disaggregated by sex)	75.00

Intermediate Results Indicators

Indicator Name	Baseline	End Target
Island Waste Management Centers Established	0.00	15.00
Coverage of O&M expenditures of RWMC from user fees	0.00	50.00

Indicator Name	Baseline	End Target
Vehicles provided to selected IWMCs to complete the integrated waste management systems	0.00	15.00
Organic waste treated in IWMCs put to productive use (composting)	0.00	50.00
Waste disposal capacity at Island Waste Management Centers (IWMCs) created under the project	0.00	150.00
Policy on solid waste minimization drafted	N	Y
Waste disposal capacity at Regional Waste Management Center (RWMC) created under the project	0.00	150.00

Annex 2: Detailed Project Description

The Project and Components

1. The Project Development Objective is to improve solid waste management in selected zones.

Instrument and approach

2. Investment Project Financing (IPF) is being used to provide an IDA Grant to finance the proposed project supporting various activities in five components, for a period of six years. This period will allow sufficient time for the government, Island Councils, and communities to achieve the PDO, taking into account various lessons from previous experiences. The first component will provide technical assistance in the form of studies, training, and other capacity-building activities to supra-regional activities spanning one or more zones or the entire country. Components 2 and 3 will support investments required in selected zones, with Component 2 supporting regional facilities and Component 3 supporting island-level interventions, including the design of the integrated waste management system for Zones IV and V, already identified by the government for IDA funding support. Component 4 will support the dedicated PMU created in MEE, under WMD. Component 5 is a zero-budget contingency emergency response component.

3. Except for the activities in Zone II, a framework approach will be used for all other activities in the other zones included in the proposed project (in Zones IV and V), because the final locations of those activities are still to be determined. This approach will make it possible to include activities that are to be identified later, subject to meeting established criteria that include, inter alia, completion of comprehensive feasibility studies, and compliance with the project's Environmental Assessment requirements. Two comprehensive mid-term implementation reviews are envisaged to make adjustments to project components and expected results. The first review will take place 18 months after project effectiveness (when most studies informing investments are expected to be completed), and the second review will occur 18 months after the first review, at the temporal halfway mark, to take stock of implementation and make further course corrections.

4. The government has indicated strong willingness to reallocate its SWM Budget provisions, which have substantially increased in recent years, to support decisions made at the mid-term reviews.

5. The five project components are described in the sections that follow.

Component 1: National Solid Waste Management Strategy and Policy (US$3.00 million)

6. This component will finance activities related to technical assistance, studies, and capacity building for implementation of the Solid Waste Management Policy 2015 and comprehensive strategy. This component will be guided by constraints identified to date and priorities emerging from the Solid Waste Bill, currently scheduled for deliberations in the Majlis later this year. Component 1 will support the development of a nationwide Solid Waste Management Strategy. It will also support technical

assistance for initiatives proposed for other zones, not just IV and V, as long as the activities conform to the requirements of the ESAMF and funding is available. Candidate areas include reuse of construction debris, ocean plastics, and extended producer responsibility. This work will set the scene for a review of the Solid Waste Management Policy in 2019–20 (first mid-term review of the project). In addition, Component 1 will finance investment feasibility studies to establish the integrated waste management system in Zones IV and V, as well as capacity building for various stakeholders, such as WMD, EPA, WAMCO, and NGOs. To accomplish these tasks, Component 1 is structured into three sub-components.

7. **Sub-component 1.1: Solid Waste Management Strategy,** supports the government's efforts to address current challenges to effective SWM in Maldives. This sub-component will include a study to analyze the amount of user fees and tariffs applied to solid waste collection and treatment needed to ensure maximal coverage of recurring costs while providing adequate incentives to waste producers to fully participate in the SWM system, and the mode of collecting those fees and tariffs. It supports the identification of improved methods to handle non-biodegradable waste streams through waste minimization, and mechanisms for recycling suitable streams like plastic bottles. It will also help the Maldives identify what other enabling mechanisms are required before advanced waste management concepts (such as extended producer responsibility and a waste tracking system) can be realistically undertaken, especially in the context of small islands. All these analyses will contribute to the development of a comprehensive national Solid Waste Management Strategy.

8. This component will also support the design and implementation of national or zone-specific IEC campaigns promoting household waste segregation and the increased uptake of bulk water as an alternative to water in plastic bottles. Campaigns will include targeted audio-visual information promoting segregation of biodegradable and non-biodegradable wastes and recycling at the island and/or household level. They will also support proper use of facilities already created for Maldivians—for example, to slow the increase in bottled water for drinking they could advocate the use of piped/bulk water supply in cities/islands where water quality is adequate. Other topics that IECs could pursue include island waste management planning, prevention of public littering, community composting, and user-pay mechanisms. A small amount of funding is also available to undertake additional studies for any need identified during project implementation—either arising from current studies or identified by the government as it undertakes SWM across the country.

9. **Sub-component 1.2: Feasibility Studies and Investment Preparation** supports a suite of activities to establish the integrated waste management system in Zones IV and V. Activities include investment-grade studies to ensure that the new system being designed for Zones IV and V is viable and fit for purpose. Sub-component 1.2 will also finance the feasibility study and other specialized Environmental and Social Assessments. Together, these instruments will provide the assurance that the RWMC and all IWMCs to be financed under the project have considered the environmental and social aspects in advance of the investment decision.

10. The key study will be the feasibility study for determining the most suitable integrated SWM system for the islands included in Zones IV and V. It will identify an optimal system for the transport, storage, treatment, and eventual disposal of the waste collected from islands in these zones. It will also identify additional criteria that islands need to satisfy before a particular system (for collection, transportation, segregation, and treatment of biodegradables, and storage of the more recalcitrant material by the RWMC) can be implemented. A detailed and comprehensives transport logistics analysis will also form part of this study, given that transport is one of the most important determinants of the location and financial viability of the new facilities for Zones IV and V. As noted, the study will also help to choose the most appropriate technology for waste treatment and disposal in the new locations. Another objective of the study is to identify the most appropriate contracting model to ensure optimum use of the new facilities as soon as installation is complete and that the operating team (mostly from WAMCO) has acquired the requisite capacity. This sub-component will also fund the ESIAs for IWMCs as sites are selected across Zones IV and V. A BPEO study will inform the final decision for the configuration of the RWMC, including the site and operating conditions.

11. **Sub-component 1.3: Institutional Capacity Building** will reinforce the capacity of local institutions and individuals (including MNU, WAMCO, EPA, and WMD) in the SWM sector. In the formal education sector, it will finance augmentation and improvement of the curriculum for the MNU course on Bachelor of Environmental Management, including modules pertaining to waste management. This investment will build improved, long-lasting local capacity to handle SWM without substantial expenditure on scholarships to send students abroad, which carries the risk that some will not return.

12. Initial training of WAMCO staff will include, but not be limited to, several topics that have already been identified. It will also support an O&M contract for the Vandhoo facility with twinning arrangements for WAMCO staff to benefit from learning by doing.

13. Capacity in the EPA will be strengthened by (a) supplying equipment to collect and transport samples of waste and (b) training staff in advanced methods for these activities. This support will include the provision of a seafaring vessel and vehicles, which would be used for monitoring and surveillance of illegal disposal of waste, including in the marine environment.

14. Sub-component 1.3 will also support the organization of and participation in national and international SWM-related events to exchange knowledge and experiences by MEE, WMD, and other stakeholders. In particular, it will focus on developing the Maldives' leadership position in advocating effective management of marine litter, including ocean plastics, especially in the context of the South West Indian Ocean region. These events, in the Maldives and abroad, will foster wider discussion of the operational issues related to regional waste management facilities. As more facilities become operational in the coming years, support under this sub-component can convene current and would-be practitioners and experts at a national workshop on operational issues, successes, and lessons from operation of the RWMC in Zone II. In the first instance, this event will be organized about six months after routine operation commence at this facility to inform the selection and design of RWMC options

across the zones where they are under development. If needed, this event could be repeated annually, with wider experiences being shared in subsequent events.

15. Outputs from all Component 1 efforts support revision of the Solid Waste Management Policy 2015, which will be formally launched around the mid-term of the current project, and a comprehensive Solid Waste Management Strategy. This review is expected to take about one year and should be able to support a revised/augmented Solid Waste Management Policy for the country from 2020.

Component 2: Regional Waste Management Systems (US$7.50 million)

16. Component 2 has two sub-components, focusing on (a) completing residual investments in Vandhoo, where the RWMC for Zone II was constructed under MEMP, and (b) supporting treatment and processing of residual non-compostable waste from islands in Zones IV and V in line with the outcome of the feasibility study conducted under Sub-component 1.2, consistent with the framework approach. This component has 100% climate mitigation co-benefits.

17. **Sub-component 2.1: Regional Waste Management System in Zone II** supports investment activities in Zone II to operationalize the facilities created under MEMP in Vandhoo**.** This sub-component targets improved use of Vandhoo RWMC, which is not being used to capacity. Support will meet the needs for works and equipment identified during preparation—specifically, the provision of equipment (a Jib crane to lift waste containers from vessels bringing waste to the island, a solid waste sorting line, and excavator), augmentation of storage facilities, and access roads on the site. Auxiliary items like fuel and water tanks will also be installed. Appropriate weighing facilities to improve management control, and an information system, are included in this sub-component.

18. To understand the extent to which recycling is possible at the zone level, the project will also support two pilot auctions of recyclable material like metals (whether cans or sheets). The pilots will help to establish the modalities for such activities to be continued during the operation phase, if there is enough sustained interest among recyclers. They will also provide insight into how much material is required, and how often, for such auctions to attract interest from serious players.

19. **Sub-component 2.2: Regional Waste Management System in Zones IV and V.** This system will be designed based on the outcome of the studies described in Sub-component 1.2, in line with the framework approach in which comprehensive studies in the first 18 months of the project to inform the design and selection of investments. Based on outcomes of the studies, as well as on the available budget envelope, the project will fund selected recommended investments to help establish the new RWMC and ancillary facilities and services like waste transport vessels for Zones IV and V. The menu of eligible investments includes: waste to energy plant, incineration, land filling, recycling, and ancillary facilities required for operation of the new RWMC (harbor and landing jetties, transport vessels, cranes and other equipment, storage areas, and facilities for staff). The final contracting model could include a Design-Build-Operate type contract, which may be preferred for this sub-component to leverage expertise and ensure that the treatment system operates optimally from the beginning and that the capacity of the operating team is built during the initial operation period. Learning from the MEMP, it is preferable to fund the entire treatment train as one contract.

Component 3: Island Waste Management Systems (US$5.00 million)

20. This component will support development/completion of island facilities for managing the collection, segregation, on-site treatment of biodegradable waste, and storage of residual waste, until its eventual transfer to the regional facility. Candidate zones for the project are currently Zones IV and V, in addition to residual activities in Zone II. This component has 100% climate mitigation co-benefits.

21. **Sub-component 3.1: Island Waste Management System in Zone II** focuses on island-level activities to supply the remaining equipment and some mobilization actions for Zone II to facilitate improved use of the RWMC capacity in Vandhoo. This sub-component will supply two types of vehicles (trucks and motor tricycles) for collecting waste on the islands in Zone II, and shredders as well as weighing scales for those islands. This sub-component has been revalidated to take into account investments already proposed to be made with government funding. These activities are not part of the framework approach.

22. Sub-component 3.1 will also pilot the use of bulk water in place of water in plastic bottles. The use of water dispensers will be supported on two islands: a small island with a population of several hundred individuals, and a large island with several thousand individuals. The study under Sub-component 1.1 will inform this effort with a view to determining the feasibility of using such schemes more widely with (if/where appropriate) a take-back scheme for bulk suppliers with appropriate (dis)incentives.

23. **Sub-component 3.2: Island Waste Management System in Zones IV and V** funds the preparation and implementation of IWMPs across atolls in Zones IV and V, following a framework approach. The support will include investments to operationalize one of the two or three different possible models of integrated waste management systems depending on population, waste generator profile, land availability, and other relevant parameters (selection criteria are described in the technical section that follows this description of project components). In order to be eligible for funding, each Island Council needs to have IWMP approved by the EPA, be subject to an environmental assessment and social assessment in line with the ESAMF, and have fixed a tariff from each generator of solid waste (including households, commercial and industrial establishments, and government institutions) to support implementation of the IWMP. Currently, funding is expected to be sufficient to cover all potentially eligible islands in these two zones, as some islands in Zone V are already supported to a limited extent under the government LECReD program (Box 1). This effort will be revisited and updated during the mid-term reviews.

Box 1: Low Emission and Climate Resilient Development

Funded by the Government of Denmark, and implemented by the United Nations Development Program in Laamu Atoll of Zone VI, this program aims to enhance national and local capacity to support low-carbon lifestyles, climate change adaptation, and disaster risk reduction. The program assists Laamu Atoll and its islands to realize Low Emission and Climate Resilient Development (LECReD) by mainstreaming LECReD issues into local development planning and service delivery for greater community ownership and sustainability of program benefits. The program envisions that local development plans (at the atoll and individual island levels) will evolve from

standalone action plans into more strategic, evidence-based instruments, which are climate smart and able to mobilize public and private investment. This program is closely linked to the national development planning cycle and will build capacity of local and national partners engaged in these local processes. In pursuit of its core objective, the program will achieve the following outputs:

- Output 1: Partnership, coordination, and participation platform for local LECReD planning and action is strengthened.
- Output 2: Data and knowledge systems established or identified to support evidence-based planning and policy development for LECReD at the local level.
- Output 3: Improved local-level planning and management for LECReD.
- Output 4: Practical local experience in LECReD interventions leads to learning and promotes replication.

As part of Output 4, the program will establish proper waste management systems for waste segregation, composting, recycling, transport, and storage in Laamu Atoll, to improve the resilience of the atoll's ecosystem.

Component 4: Project Management (US$2.00 million)

24. This component will finance equipment, technical assistance, training, and incremental operating costs to strengthen the dedicated PMU established within MEE. A boat for intra-zone travel will be procured and eventually handed over to the RWMC for Zones IV and V. The PMU will assist the government in managing, monitoring, and evaluating project activities. Even when other stakeholders may provide technical inputs, such as ToRs and specifications for materials, equipment, or items to be procured, the fiduciary aspects of these activities will be handled by the PMU staff. Specifically, Component 4 will support staffing and operation of the PMU, establishment and operation of an adequate fiduciary and safeguard management system, communication and outreach, and grievance redress. Headed by the head of WMD, the PMU will have responsibility for ensuring that financial, procurement, and safeguards management for project preparation and implementation conform to the legal agreements with the Bank. In addition, a communication specialist and an M&E specialist will also be part of the PMU. A civil engineer will also be added to the PMU as and when needed. In addition, support staff including project coordinators, assistant procurement officer, and assistant financial management officer will be drafted into the PMU as needed. Some sub-components such as the IEC campaigns could be managed centrally by the PMU, with help from other external stakeholders like NGOs or activist groups contracted for specific activities and/or items.

Component 5: Contingency Emergency Response (US$0 million)

25. In accordance with OP10.00, paragraphs 12–14, for situations of urgent need of assistance that may arise during the life of this project, this component will allow for rapid reallocation of project proceeds in the event of a natural or man-made disaster or crisis that has caused or is likely to imminently cause a major adverse economic and/or social impact. To trigger this component, the government must declare an emergency or provide a statement of fact justifying the request for the activation of the use of emergency funding. To allocate funds to this component, the government may request the

Bank to reallocate project funds to support response and reconstruction. If the World Bank Group agrees with the determination of the disaster and associated response needs, this proposed component would allow the government to request the Bank to re-categorize and reallocate financing from other project components to cover emergency response and recovery costs. This component could also be used to channel additional funds should they become available as a result of an emergency. Disbursements would be made against a positive list of critical goods or the procurement of works and consultant services required to support the immediate response and recovery needs. An Emergency Response Operations Manual will apply to this component, detailing financial management, procurement, safeguards, and any other necessary implementation arrangements.

Timeline and Sequencing

26. A major lesson considered in designing the proposed project is that all investments should be implemented in a coordinated timeframe. Table 6 presents an indicative timeline for implementing the components of the proposed project.

Table 6: Sequencing of components of the Maldives Clean Environment Project

	TIME ->	2017	2018		2019			2020		2021		2022		2023	
Number	Component Description	H2	H1	H2		H1	H2	H 1		H2	H1	H2	H1	H2	H1	H2
1	National Solid Waste Management Strategy and Policy															
1a	Solid Waste Management Strategy															
1b	Feasibility Studies and Investment Preparation						Review of SWM Policy 2015									
1c	Institutional Capacity Building															
2	Regional Waste Management Systems															
2a	Regional Waste Management System in Zone II															
2b	Regional Waste Management System in Zones IV and V															
3	Island Waste Management Systems															
3a	Island Waste Management System in Zone II															
3b	Island Waste Management System in Zones IV and V															
4	Project Management															

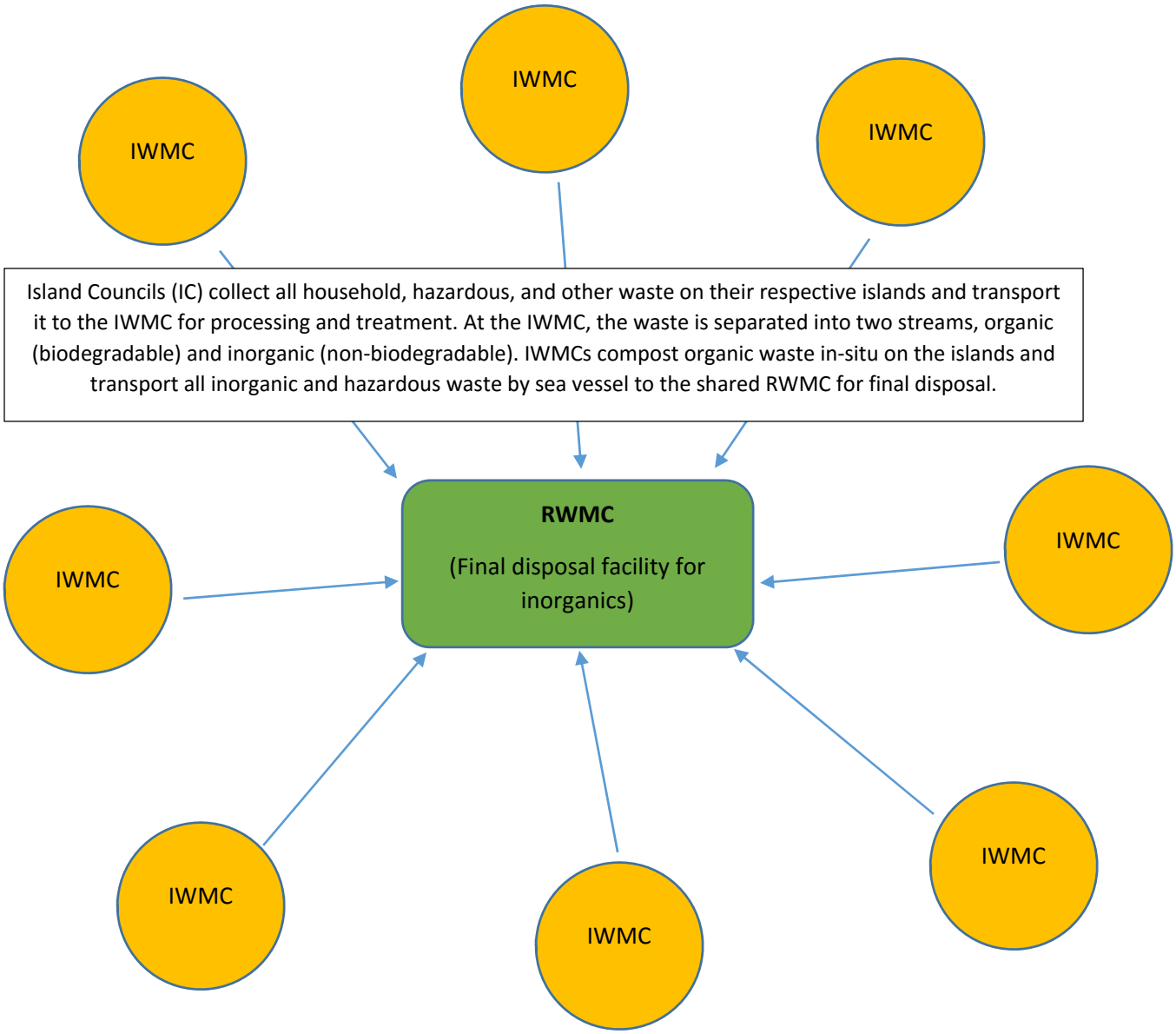
Mid Term Review 1

Mid Term Review 2

Technical and Engineering Aspects of the Project

27. **The government's program,** as noted in the main section of this document, aims to provide sustainable waste management services using an integrated waste management approach in each region/zone of the country (depicted in Figure 1).

Figure 1: The national program—an integrated waste management approach in each zone/region



28. **The integrated approach consists of each zone being served by waste management centers (IWMCs) on each inhabited island in the zone and one regional center (RWMC) in the same zone.** Where it makes financial and economic sense, depending on proximity and volume of waste, one RWMC may serve more than one zone. The actual technology chosen for the RWMC is not known at present; it will be chosen following a detailed feasibility study financed by the proposed project. It is certain that organics will be composted at IWMCs, but the particular technology and size of the composting facility on each island will be determined through a feasibility study that will: (a) examine technical and engineering alternatives; (b) present a financial and economic analysis of each option; (c) review the environmental and social considerations of each option; (d) determine O&M requirements for each option; and (e) entail a market study analyzing composting, recycling and waste to energy potential. The feasibility study will recommend the appropriate technology and O&M arrangements and include bidding documents for the execution of these works. Detailed ToRs for these studies have been prepared by MEE and are available as part of the project records.

29. **The selection criteria for participation in the proposed project are shown in Box 2.**

Box 2: Criteria for selection of Island and Regional Waste Management Centers

For IWMCs:

- An Island Waste Management Plan (IWMP) is prepared and approved by the Environmental Protection Agency (EPA).
- Assessments to meet the requirement of the Environmental and Social Assessment and Management Framework (ESAMF) are completed.
- A scheme of tariffs to be collected from each generator of solid waste (including households, government institutions or commercial and industrial establishments) to support the implementation of the IWMP has been fixed.

For the RWMC:

- The facility is shown to be technically, financially, and economically feasible based on the feasibility study undertaken under terms of reference acceptable to the World Bank.
- Assessments to meet the requirement of the ESAMF, including the Best Practical Environmental Option study, are completed.
- An Operation and Maintenance contract is secured.

Data on waste streams at the island levels

30. Based on the feasibility study prepared for the North Province under MEMP, approximately 70% of waste generated in the region is contributed by households, 25% by resorts, and 6% from industrial

activities/workers. The waste generation factors for the three main sources of waste based on the Environment Research Centre [9](ERC) model and the waste audit carried out under MEMP is:

- **Household waste:** An average value of 0.83 kg per person per day has been used for waste generation from households with an annual increase of 0.4% until 2032.
- Commercial waste or waste generated by industrial workers at 0.22 kg per person per day with an annual increase of 0.4% until 2032.
- Resort waste is 3.5 kg per bed per day with an annual increase of 0.4% until 2032.

Waste composition

31. A waste audit was carried out in the North Province at selected islands and at a resort with the objective of understanding the composition of waste generated from North Province, as the earlier estimates were based on assumptions from similar studies in other regions of Maldives and the Malé area. The waste audit was done under MEMP during December 2010–January 2011. The resulting data have some features that should be noted:

    - Island data are for households only and do not include waste generated from cafes, shops, schools, and other institutions that may generate high volumes of plastic bottles, paper, and cardboard.
    - The audit did not cover all households across the range of islands, but the collected data are considered to be representative and indicative of household waste composition across the region.
    - The audit surveyed only one resort in the region, but all have common features such as buffet meal plans, an average 1:1 staff-to-guest ratio, and standard operating procedures for waste management. For that reason, it is assumed that the data can be used for the resorts in the North Province and across Maldives.
    - Waste generated by industrial and commercial units was not studied separately. The high percentage of employees/expatriate workers, 51% (ERC data) of the residential population, will make a significant change in the waste generation numbers with even a small change in the waste generation factor.

32. Table 7 and Table 8 show the average composition of waste derived from the MEMP audit for the inhabited islands and resorts, respectively.

[9] The ERC became a defunct organization when it merged with another organization in Maldives to form the current EPA.

Table 7: Waste composition (by % weight) for inhabited islands, North Province, Maldives

Waste composition category	Surveyed inhabited islands					
	Hinnavaru (%)	Naifaru (%)	Edhafushi (%)	Maalhos (%)	Lhohi (%)	Overall distribution (%)
Paper and cardboard	6.6	4.9	2.3	8.1	0.9	4.3
Organics	59.8	61.2	72.8	63.7	70.7	66.1
Glass	2.6	1.8	1.5	2.3	2.1	2.0
Plastics	7.4	6.1	5.4	4.0	3.2	5.3
Metals	2.9	1.1	0.2	0.3	0.2	0.9
Hazardous and infectious	7.5	5.8	11.3	5.1	10.0	8.3
Other	13.2	19.2	6.5	16.5	13.0	13.1
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Table 8: Resort waste composition, North Province, Maldives

Composition category (% distribution)	Komandoo Resort / Lhaviyani Atoll
Paper and cardboard	10.0
Organics	73.7
Glass	6.5
Plastics	5.4
Metals	1.8
Hazardous and Infectious	0.2
Other	2.5
Total	**100.0**

Recycling opportunities

33. According to the Vandhoo Business Plan developed by WAMCO[10], expected revenues from recycling are very low due to very low prices of recyclables on the Maldives market. Glass is sold for MVR2.00/kg, plastics for MVR1.00/kg, and metals for MVR2.00/kg. The study presented no prices for other valuable recyclables such as paper and various grades of plastic. The main reasons for these low prices could be the significantly high transportation costs and low volumes sold, which could possibly be resolved by auctioning large volumes every quarter or semiannually, as well as by lowering transportation costs by reducing to a minimum collection and transportation of recyclables from the islands to the RWMC, where the auction will take place. Under current pricing and transport costs, a recycling scheme does not seem to be financially viable in the context of Maldives. The feasibility

[10] WAMCO Business Plan: Operation and Maintenance of R. Vandoo Regional Waste Management Facility, fourth draft, 10 April 2016. For this analysis, the model is modified to incorporate the additional investments in equipment (US$0.5 million) that will be funded under the proposed project to make it operational, which affects the depreciation costs included in the analysis. Other key changes are presented in the discussion.

study will undertake a detailed analysis and provide valuable information to better assess the potential for a viable recycling market as part of the overall waste reduction strategy.

Economic analysis

Benefits

34. The project will benefit Maldivian society through:

- Reduced health risks to residents and tourists from waste accumulation and open burning of waste.
- Reduced ocean pollution, notably with plastics, which impacts marine ecosystems and livelihoods based on fisheries.
- Reduced coastal degradation, including of coral reefs, from waste dumping in the ocean. Coastal degradation manifests itself in the form of littered beaches and coastal waters, which are a critical liability for the tourist industry, and damaged coral reefs, which provide crucial services, such as protection of juvenile fish, protection against floods, and recreation for tourists.
- Generation of compost that would contribute to the development of soil fertility, agriculture, and food security on the islands.

35. Waste dumping and open burning also impact the global community through increased marine pollution in the Indian Ocean and by the release of greenhouse gases and persistent organic pollutants, which would be reduced through the project.

Costs

36. The project's costs will include capital costs and the O&M cost associated with the project's investments during their useful life. They also include any recurrent costs of monitoring, enforcement, and institutional capacity building to institutionalize a sustainable SWM system as envisaged by the government.

37. The Project Appraisal Document (PAD) for MEMP demonstrated that given the high tourism value of coral reefs, the estimated breakeven benefit for achieving an acceptable economic internal rate of return of 12% would be attained by preventing degradation of a mere 0.14% of reef in the project area. However, as the Implementation Completion and Results Report for MEMP demonstrates, the economic benefits have not yet materialized under MEMP, because the SWM facilities funded by the project are still largely not operational. Investments under the proposed project aim to make those facilities operational. While this added investment will increase the overall costs, the tourism benefits linked to coastal degradation will still significantly exceed the aggregate costs.

38. While completing the facilities and bringing them into operation is the first step, the economic benefits will not be realized until the facilities are in continuous operation as envisaged in the national SWM plan. Financial sustainability, namely availability of adequate funds to cover the costs of operating the system, including monitoring, enforcement, and institutional capacity building, is one

of the preconditions for continuous operation. Therefore, the analysis in this annex focuses on financial sustainability of SWM operations in Zone 2.

Overview of financial sustainability analyses

39. The ability to fully finance the following in a continuous manner will be a key determinant of sustainability:

    a. O&M costs of the RWMC and IWMC, including collection on the islands[11] and transportation between the IWMCs and the RWMC in the zone. Of particular importance is that WAMCO or the operator it retains has adequate resources at all times to operate the incinerator at the RWMC according to global best available practice to minimize emissions of air pollutants, including the toxic persistent organic pollutants dioxin, furan, and mercury.

    b. The SWM system that the government wishes to institutionalize and that is supported by the proposed project will require significant changes in behavior among the waste generators (notably segregation at source, no illegal dumping or burning, paying a fee for waste collection), and new organizational efforts on the part of Island Councils (notably reliable scheduled waste collection, continuous operation of the IWMC, and preparation of segregated inorganic waste for scheduled transfer to RWMC, as well as enforcement against illegal disposal on the islands). Incentives, awareness raising, institutional capacity building, and monitoring and enforcement will be necessary to achieve these changes. These measures entail non-negligible recurrent costs that must be provided for in WAMCO's operational budget.

40. The analysis first analyzes financial sustainability at the island level, followed by sustainability of the Vandhoo RWMC.

IWMC-level recurrent cost recovery analysis

41. The analysis uses the User Pays Framework produced under MEMP in 2010 by a consortium of consultants.[12] The framework covers five types of waste generators/SWM service users, namely households, small shops, large shops, cafes, and institutions. It incorporates a number of different solid waste processing technologies at the IWMC, for processing organic and inorganic wastes. The User Pays Framework is designed to calculate a level of service fee for each user type that equals the O&M cost of each combination of solid waste processing technologies at the IWMC. A significant drawback of the model is that it does not incorporate the cost of collecting waste from various waste generators on the island.

[11] In this annex, "island" refers to an island that is not dominated by one or more resorts and has its own waste management system administered by the Island Council. A "resort" may or may not cover an entire island, but operates its own waste management. It is understood that there may be mixed cases, but they are believed to be very few and are not considered.

[12] WASTE, Green Partners, and Live & Learn Environmental Education (2010), "Developing a User Pays Framework for Island Waste Management Services." Prepared for the Maldives Environmental Management Project, Ministry of Housing, Transport, and Environment, and the Environmental Protection Agency, Government of the Maldives. Final Report, May 2010.

42. The analysis considers two options combining the available waste processing methods. In both cases it is assumed that one permanent worker is employed at the IWMC:

    Option 1: Compost at full island scale + Separating and storing plastic

    Option 2: Compost at full island scale + Separating and storing plastic + Pet cutting and baling

43. **Methodology.** The scenario analysis methodology was used to take into account the large number of uncertain variables that impact the cost recovery level of service fee and the range of values they may plausibly take. Each combination of the variable values defines a distinct "scenario." The model was run more than a thousand times using a special algorithm that takes into account all scenarios and calculates the likelihood that the desired outcome, namely cost recovery, is achieved. Since the cost data used in the analysis were from a 2010 study, the estimates were adjusted to the 2016 level for this analysis, using a GDP deflator of 30.5% (World Development Indicators 2017).

44. **Results.** Table 9 represents the estimated mean cost recovery fees by waste generator type in each option. The large cost increment of adding pet cutting and baling to the IWMC process is noteworthy.

Table 9: Estimated mean cost recovery fee, MVR/month, by waste generator type

	Households	Small shops	Institutions	Cafes	Big shops
Option 1	97	150	299	136	291
Option 2	158	487	244	222	475

45. Importantly, considering that service fees charged to households are currently in the range of MVR100–140[13] and the fact that the above cost estimates do not include collection costs on the islands, it is clear that there is no room for the Island Councils to contribute to the cost of transporting the segregated inorganic waste to the RWMC. In other words, it will be necessary for the IWMC–RWMC transportation cost to be funded either by WAMCO from charges to the resorts or through government subsidies or a combination thereof. Such subsidization appears necessary to ensure that sufficient resources are available to the Island Councils to effectively collect and segregate all waste generated on the islands.

46. On the other hand, it will be important to encourage IWMCs to achieve 100% collection[14] and segregation of waste into organic compostable and nonorganic (including organic non-compostable) wastes. The next analysis explores this point.

RWMC level recurrent cost recovery analysis

[13] Pre-appraisal mission notes from visits to Zone 4 islands.
[14] Collection includes waste generators delivering their waste to the IWMC with their own means.

47. The analysis uses an adjusted version of an income statement model used in the Vandhoo Business Plan which calculates annual pre-tax profits as the difference between total revenues and total recurrent costs. The key elements of the analysis are discussed next.

48. **Amount of waste to be transferred to RWMC.** The amount of waste that needs to be transferred to the RWMC will depend on levels of illegal disposal and of segregation. Table 10 lists other variables that impact the amounts of waste generated and transferred to the RWMC, together with the values assumed in the analysis.

49. **Waste segregation ratio.** In the target SWM system, 100% of the waste generated is collected (islands) and segregated, and only non-organic waste is transferred to the RWMC. As mentioned, however, this is a long-term target that will require significant behavioral, institutional, and organizational change to reach. The Maldives is starting at a very low level. To reflect this gradual evolution, the analysis is built around four stylized scenarios of waste segregation, namely 25%, 50%, 75%, and 100%. These levels represent averages across all islands and resorts (Table 11).

Table 10: Assumptions made on the values of key variables in the analysis

Variable	Value
Waste generated in the resorts	
Share of inorganic waste	40%
Waste generated per bed	3.5kg
Resort occupancy	78%
Wastes from the islands	
Share of inorganic waste	35%
Average amount of waste generated per person	0.75 kg/day
Average number persons per household	6.5
Average amount of waste generated per business	10 kg/day
Average amount of waste generated by restaurants and cafes	15 kg/day
Average amount of waste generated by government	8 kg/day
Recurrent cost structure	
Personnel at the RWMC for advanced sorting and managing of recyclables	5
Fuel cost	MVR11/liter
Recycling	
Scrap metal content (resorts/islands)	0.2%/0.9%
Scrap plastic content (resorts/islands)	5.4%/5.3%
Glass content (resorts/islands)	6.5%/2.0%
Scrap metal price	MVR2/kg
Scrap plastic price	MVR2/kg
Glass price	MVR1/kg

Table 11: Waste generated and transferred to RWMC under four segregation scenarios

	Total waste generation (t/month)	Waste transferred to RWMC under different segregation rate scenarios (t/month)			
		25%	50%	75%	100%
Islands	2,151	1,093**	1,129***	1,102	753
Resorts*	410	201**	225***	225	164
Total	2,561	1,294**	1,354***	1,328	917
Recyclables	226	158	158	226	226

Note: * 20 already established resorts. **/*** Only 52%/70% of unsegregated waste assumed accepted for transfer to keep the to-be-incinerated waste within daily incinerator capacity.

50. **Cost of transportation.** The cost of transportation will depend on the amount of waste transferred, the distances from the RWMC, the frequency of transfer, and the cost of fuel (see Table 10 for some of the values assumed). In this analysis, it is assumed that WAMCO or the Vandhoo RMWC operator organizes periodic transfers from each atoll, separately for the islands and for the resorts, the frequency of which depends on the total waste to be transferred from those sites. An important assumption of the model is that segregated as well as unsegregated waste is accepted for transfer up to the daily incineration capacity in Vandhoo. The justification for this assumption that if the waste is not removed from the island or resort, it will be disposed of in a manner harmful to the environment. Measures should be taken to increase segregation over time, as discussed later. (Table 12 presents transportation costs by segregation scenario.)

Table 12: Total costs and resorts' share of costs by segregation scenario

	Segregation rate scenario			
	25%	50%	75%	100%
Total costs (1,000 MVR/month)	2,916	2,961	2,928	2,604
Islands' share	2,487	2,497	2,459	2,159
Resorts' share	429	465	469	445
Resorts' share per bed* (MVR/bed/month)	85.6	92.8	93.7	89.0

Note: * Bed capacity = 5,006 beds in the 20 resorts currently in Zone II (WMC 2016).

51. **Cost of RWMC operations.** The cost of processing at the RWMC depends on the amount of waste delivered. In the scenarios with 100% and 75% segregation, where combustible waste is less than the incinerator's capacity, batch incineration is assumed, with corresponding periodic shutdowns and restarts leading to increases in the fuel cost.

52. **Monitoring and enforcement costs.** Monitoring and enforcement to ensure that waste is not dumped illegally in coastal areas or the ocean, or burned, may be the responsibility of the EPA rather than WAMCO or the RWMC operator. Regardless, it is important that this function be recognized as an important activity, the cost of which is high and must be covered, so it is included in this analysis among the RWMC costs. The Vandhoo Business Plan used an estimate of some MVR32,000 per month. In this analysis, that amount is multiplied by 10 to roughly cover the salaries of a central enforcement coordinator, one enforcement officer per atoll, and an average weekly fuel cost of

MVR15,000 of patrolling the atolls (Table 12). The true cost of effective monitoring will be assessed in the feasibility study under the proposed project and incorporated in the budget for running the RWMC system, to be covered by either the government or from service fees. *Effective monitoring also requires a regularly updated database to be in place to track the islands' waste generators, waste composition, and waste management facilities.*

53. **Service fees.** This analysis does not recommend a specific level of service fee for the resorts or a level of government subsidy, given the significant uncertainties in the system. Rather it recommends the following scheme to give incentives for reaching the SWM system's targets.

- *Flat per bed fees for resorts*. The study recommends that resorts be charged a flat per bed (capacity) fee at least at a level that covers the resorts' share of RMWC costs, including, as mentioned, transportation, site operations, and monitoring and enforcement. This level depends largely on the total and relative (resorts vs. islands) amounts of waste transferred. The model estimates, subject to the assumptions made for several key variables, such cost-recovery level flat fees for the target 100% segregation scenario. The actual level of fees levied from the resorts will be a function of (among other things) negotiations between the government and the resorts. Clearly, the decisions on fees and subsidy allocations will have to be dynamic, adjusting, possibly on an annual basis, to changes in the levels of waste transferred as well as other variables.

- *No transfer charges for fully segregating islands.* Islands that achieve 100% segregation of the waste generated should not be charged any fees for the transfer and disposal of their wastes. It is recommended that the cost be covered through a combination of government subsidy to WAMCO and fees from the resorts.

- *Penalties for non-segregation*. Both islands and resorts that do not reach 100% segregation, as ascertained through regular monitoring, should be charged a penalty. The penalty could be per kg of unsegregated waste and set at a level that provides an incentive to segregate—in other words, higher than the cost of segregation. The feasibility study should make concrete recommendations on this issue, also drawing on consultations with stakeholders. Besides penalties, there should be monetary and other rewards for islands and resorts that comply with the SWM system, including 100% segregation.

54. **Recycling revenues.** WAMCO/the RWMC operator could derive revenues from selling recyclables, including plastics, metals, and glass. A dedicated study and auctions under the proposed project will explore how this system can be best organized and what prices may be fetched. Given the uncertainty about prices at this time, this analysis assumes very conservative prices, which were also used in the Business Plan for Vandhoo to estimate potential revenues (Table 13). The analysis also assumes that the islands or resorts do not engage in the sale of the recyclables, which is realistic given the small economies of scale and the fact that the RWMC staff includes five employees dedicated to the additional sorting and management of recyclables.

Table 13: Potential revenues from recyclables

	Metal	Glass	Plastic	Total
Amount (t/month)	20.2	69.7	136.1	
Revenues (1,000 MVR/month)	40.4	139.3	136.1	315.8

Summary

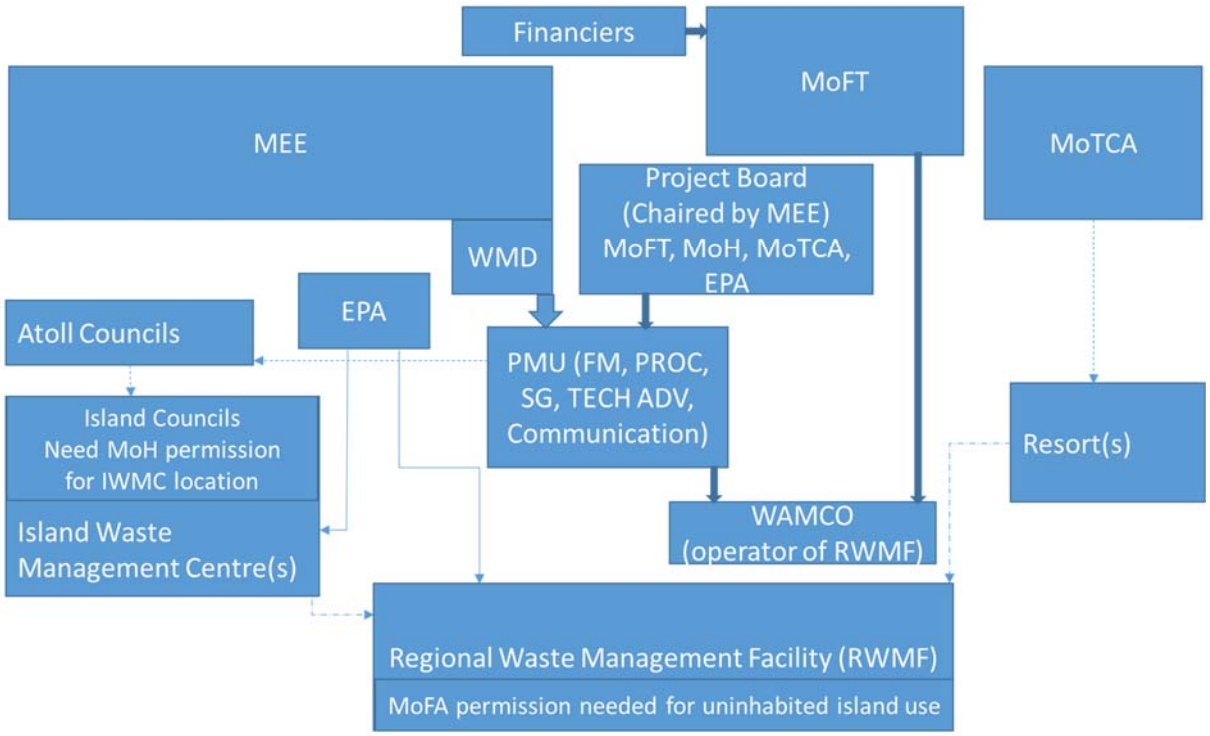
55. Ultimately, financial sustainability depends not only on the new SWM instruments discussed previously, but on introducing new policies such as extended producer responsibility (to involve producers and importers in safe end of life management of their products) and corporate social responsibility (for large-scale users such as resorts). A mix of economic instruments and policies that promote sustainable waste management, combined with agreements with the economic agents involved in their generation, will be the focus of some of the technical assistance activities supported by the project.

Annex 3: Implementation Arrangements

Project Institutional and Implementation Arrangements

1. **Building on experience from MEMP and solid waste management projects supported under the Climate Change Trust Fund, a new PMU will be embedded within WMD of MEE**. This PMU will be the key implementing mechanism for the project, housing specialists to provide input on technical aspects of SWM and cross-cutting support in communication and outreach, among other functions.
2. Figure 2 depicts the arrangements for implementing the project with institutions responsible for different aspects of SWM in the Maldives. Details of the implementation arrangements for each project component are summarized in the following paragraphs.

Figure 2: Implementation Arrangements for the Maldives Clean Environment Project



3. **A Project Board** will be created and chaired by the Minister, MEE to serve as the project steering committee. It will include all agencies listed in the figure as well as other relevant stakeholder ministries/agencies such as the Local Government Authority and Ministries of Housing, Health, and

Tourism as decided upon by the minister. The Head, WMD will serve as ex-officio Secretary to the Board, with the PMU acting as the Secretariat.

4. **A Project Management Unit (PMU)** will be established in WMD, MEE and headed by the Director General to oversee the implementation of all components of the project. Technical specialists with experience in World Bank projects will be contracted as consultants to serve in critical areas such as safeguards, and these consultants will be in place by negotiations. The PMU will (a) coordinate the activities of the IWMCs and RWMC to ensure the integrated system is working as planned, (b) coordinate WAMCO's contract with MEE, and (c) coordinate the two-year interim O&M contract for the Vandhoo RWMC. WMD will also coordinate with other stakeholder ministries and authorities to ensure smooth implementation of project activities, including capacity building. It will be staffed with experts from PMUs for ongoing projects under WMD, including MEMP, and outside experts as required.
5. **The Environmental Protection Agency (EPA)** will provide regulatory oversight of the operation of the RWMC and IWMCs in line with its mandate. It will monitor operations to ensure that these facilities comply with relevant regulatory standards and procedures and will maintain records of the same for public inspection. Additionally, the EPA will start to impose significant fines on the Island Councils and operators who have received all of the necessary support but fail to carry out their service in compliance with the prevailing law.
6. **Waste Management Corporation (WAMCO)** will operate the RWMC in line with its mandate. WAMCO and the O&M contractor will be required to work closely to ensure a smooth transition over the last six months of the contract.
7. **Atoll Councils** will coordinate with WMD and Island Councils to ensure that the IWMPs are prepared and finalized. They will also serve as a liaison between Island Councils and MEE.
8. **Island Councils** will prepare the IWMPs with support of WMD and in coordination with the Atoll Councils. They will ensure their IWMPs are fully implemented, including operating the IWMCs once established, and carry out the waste management service on their islands.
9. To guide project implementation, a Project Operations Manual (POM) has been agreed with the PMU. The POM provides specific guidelines for implementation of the disbursement, financial management, institutional, M&E, operational, procurement, and safeguards requirements.

Financial Management and Disbursement

10. The proposed financial management (FM) arrangements are in line with fiduciary requirements of OP10.00. An FM assessment of MEE was done in consultation with the FM focal point identified for the PMU. Overall, MEE is well versed in handling World Bank–financed/managed operations and is familiar with all fiduciary procedures and requirements of the World Bank. As the PMU is a new unit created under MEE, the FM staff identified for the PMU has no prior experience related to handling operations funded by the World Bank or other major donors. Hence it is envisaged that substantial

training and handholding support will be required, especially during the initial year of implementation. The overall residual FM risk is assessed to be **moderate**.

11. The PMU will be responsible for the overall FM arrangements of the project. MoFT will authorize all payments. No funds will be transferred to any other agencies. The finance officer assigned by MEE for the project in the PMU will have oversight responsibility for implementing FM arrangements. The proposed FM arrangements are considered adequate. There are no overdue audit reports or ineligible expenditures under the MEE, which is the implementing agency.

Budgeting

12. The project budget will be prepared following a bottom-up approach in a consultative process that will involve all related units/divisions. Budgets will be prepared for all activities financed by foreign funds as well as Government of Maldives funds. Final approved budget estimates for government funds for the project will be reflected in the annual budget estimates under MEE.

Financial reporting

13. The PMU will be responsible for the project financial reporting. Commencing from the end of the first calendar quarter after project effectiveness, the PMU will submit quarterly IUFRs to the Bank within 45 days from the end of each such quarter. The format of the IUFRs has been agreed with the implementing agency.

Internal controls

14. The PMU's internal controls will be documented in the POM to ensure transparency and accountability. Government of Maldives internal controls, financial regulations, and other relevant circulars will be applicable for the project.

Internal audit

15. MEE has established an internal audit unit, but it is not staffed. Therefore the existing internal audit arrangements within MEE are not acceptable and it is proposed to outsource the project's internal audit function to an external firm of chartered accountants. The project will be subject to a regular internal audit and the reports will be shared with the World Bank. The internal audit will assess whether funds have been disbursed on a timely basis, reached the intended recipients, and whether transactional controls and propriety have been maintained and used effectively and efficiently for the intended purposes.

External audit

16. Financial statements for the project will be prepared by the PMU and audited annually by the Auditor General's Office of Maldives, which is acceptable to the Bank. The audited financial statements together with the auditor's report will be submitted to the Bank within six months of the end of the fiscal year. According to the World Bank Access to Information Policy, the audit report will be disclosed

publicly on the World Bank website. The audit report will be monitored in the Bank's Portfolio and Risk Management (PRIMA) System.

Financial management supervision

17. FM supervision consists of visits by the Bank FM specialist to the PMU, desk reviews of internal and external audit reports, review of IUFRs, Statement of Expenditure reviews, and joint financial management/procurement reviews to periodically assess and monitor the adequacy of the project's fiduciary arrangements. The Bank will carry out a field-level FM supervision mission at least once every six months.

Designated Account and disbursements

18. A DA in US dollars will be set up with the Maldives Monetary Authority (the Central Bank), to receive funds from IDA. The Bank will advance an amount to the DA to meet the estimated expenditures for the first six months, as forecasted in the IUFRs. From this DA, payments will be made to suppliers, vendors, and consultants and also for incremental operating costs. IUFRs are to be submitted to IDA on a quarterly basis. With respect to large international payments above the minimum application size in the Disbursement Letter, the PMU will have the option of requesting the Bank to make direct payments to the supplier. In such cases, the claim would be net of taxes. Reimbursement and Special Commitment disbursement methods are also available under the project.

19. Several agencies/institutions will be involved in planning, coordinating, and implementing project activities. FM will however be centralized at the PMU and all payments will be made directly by MoFT from the DA with the supporting documentation provided by the PMU. It is agreed that no other entity will get involved in handling project funds and executing payments. The list of authorized signatories will be from MoFT and hence MoFT will have the authorizing rights for disbursement requests from the Bank in terms of Grant proceeds. All relevant documentation for such requests will come from the PMU to MoFT. Grant proceeds will be disbursed 100%, exclusive of taxes. Taxes will be paid from a separate bank account.

20. The PMU will maintain separate sets of books of accounts/accounting records/registers and other relevant documentation for the project to enable separate tracking of expenditures related to the project. All funds for the proposed project will be routed through the PMU, which will be responsible for funding all project expenditures, accounting for them, and for reporting on the financial and physical progress. Books of accounts will be maintained on a cash basis and all applicable accounting standards and policies will be applied. An accounting software package customized to suit the requirements of the project will be used.

21. Table 14 specifies the categories of eligible expenditures to be financed out of the proceeds of the credit ("category"), the allocations of the amounts of the credit to each category, and the percentage of expenditures to be financed for eligible expenditures in each category.

Table 14: Category of eligible expenditures, amount allocated to each category, and the percentage of expenditures

Category	Amount of the Grant allocated (expressed in US$)	Percentage of expenditures to be financed (exclusive of taxes)
(1) Goods, works, non-consulting services, consulting services, Training and Workshops, and Incremental Operating Costs under the Project	17,500,000	100%
(2) Emergency Expenditures for the Contingency Emergency Response Component	0	100%
TOTAL AMOUNT	17,500,000	100%

Retroactive financing

22. The government has requested the Bank to agree to a retroactive financing amount of up to US$1,185,000 for eligible expenses incurred on or after February 1, 2017 to be refinanced from the IDA Grant at effectiveness. The expenditure must be backed by adequate documentation, including evidence of payment, and will have been procured according to IDA procurement guidelines. The retroactive financing will finance 100% of the goods, works, non-consulting services, and consultants' services, training and workshops, and incremental operating costs, net of taxes.

Procurement

23. Procurement of all works, goods, non-consulting services, and consultancy services under the project will be carried out in accordance with the World Bank's New Procurement Framework and Regulations for Projects After July 1, 2016 issued on 28th June 2016 (hereafter referred to as the "Regulations") and the provisions stipulated in the Legal Agreement. For procurement under the project, MEE has developed Procurement Arrangements (included in the POM) conforming to the Bank's new Procurement Framework, and acceptable to the Bank. In case of any inconsistency between the procurement arrangements and the Bank's new Procurement Framework (June 2016), the latter shall prevail.

24. MEE has developed a Project Procurement Strategy for Development (PPSD) for the project.

Procurement of works

25. Major works to be procured under this project include (among others) concrete slabs for the harbor frontage and storeroom areas, paving of a road from the incinerator to the landfill, expansion of existing waste bunkers, and installation of waste storage area sheds and a waste sorting area.

Procurement of goods

26. Major goods and equipment to be procured under this project include (among others) an excavator, Jib crane for the harbor, pickup trucks, and shredders.

Selection of consultants

27. The major consultancies include the feasibility studies to determine the best integrated SWM system for Zones IV and V, ESIA studies, and BPEO study, among others. Shortlists of consultant firms for services estimated to cost less than US$200,000 or equivalent per contract may consist entirely of national consultants.

Training

28. Training will cover overseas long- and short-term studies, overseas and in-country study tours, workshops, and so on. These initiatives shall be carried out in accordance with staff development plans prepared by the PMU and agreed with the Bank.

Operating cost

29. The project will support project implementation costs and other project implementation-related costs of a recurring nature, which will include costs of incremental staff hired on contract and travel costs.

Ineligible expenditures

30. There is no expenditure included in the project's cost estimates which does not fulfill eligibility conditions of Procurement/Consultant Guidelines. During implementation, if such requirements arise, they will be financed from the governments' own resources.

Systematic Tracking of Exchanges in Procurement (STEP)

31. The project will implement STEP, a World Bank planning and tracking system, to provide data on procurement activities and establish benchmarks. The details of the procurement activities, presently prepared in the Procurement Plan, will be transferred to the STEP system. Initial training on the operation of the STEP system shall be provided to staff of PMU.

Country Procurement Assessment

32. Procurement capacity assessment studies for various entities and procurement post reviews of projects in Maldives have pointed out issues such as: (a) inadequate procurement capacities; (b) inadequate capacity of national contractors or goods suppliers, which in some cases hinders designing appropriate qualification requirements as per Bank Standard Bidding Documents for goods and works; (c) inadequate experience in contract administration; (d) poor implementation of public disclosure procurement actions; (e) inherent weaknesses in transparency and fairness of procurement processes; (f) delays in finalization of annual procurement plans; (g) ambiguous and incomplete specifications for equipment; and (h) delays in procurement decisions. The above findings are all potentially applicable for the current project.

Assessment of the MEE/PMU capacity to undertake procurement activities

33. Project has one implementing agency (MEE) through its PMU. The MEE has set up a unit in the form of a PMU to exclusively lead and achieve the PDO, coordinate project activities on a full-time basis, and directly implement most of the project sub-components. Procurement of goods/works and services by MEE is regulated mainly by the public Financial Regulations 2015.

34. An assessment of the capacity of MEE to implement the procurement arrangements has been carried out by the Bank's procurement team, which included: (a) a review of the organizational structure for implementing the project and (b) interaction with the staff concerned in MEE. MEE has implemented Bank-financed projects. Based on the implementation requirements of the proposed project, MEE has established a PMU to manage and implement the project, with the required level of delegation of powers, and a streamlined approval process. This PMU has been established only recently as a unit under MEE and draws its resources from MEE. MEE has procurement staff, but they have no experience of handling World Bank projects, and hence are not deeply aware of World Bank procurement procedures and guidelines. Therefore, a specifically selected procurement specialist (with requisite qualifications and experience) will support the PMU procurement cell, which will be responsible for procurement of goods, works, and consulting services for the project. The procurement specialist shall be hired within 2 months of effectiveness and remain throughout the project's life. The assessment found the procurement risk to be **moderate**.

35. Procurement of all works, goods, and consultancy services will be carried out in accordance with the procurement regulations of the Bank. As noted, the PMU has developed procurement arrangements for the project (detailed in the POM). Under these arrangements, the PMU is fully responsible for the entire procurement cycle, from bid document preparation and invitation to contract signing and contract management for procurement under the project. The PMU will ensure timely procurement as per the Procurement Plan prepared by the project, or as per the Annual Action Plan.

36. Based on the above position, as well as the actions proposed by MEE, it is assessed that the project will have appropriate procurement capacity with the support of a qualified and experienced procurement specialist to handle the intended procurement activities.

37. Table 15 presents the procurement strategy for the proposed project.

Table 15: Procurement strategy for Maldives Clean Environment Project

Risk factor	Initial risk	Procurement strategy to mitigate the risk	Residual risk
Record-keeping and documentation	High	• The project has prepared procurement arrangements addressing these issues. • At the beginning of the project, a brief overview of the documents to be maintained and filed will be discussed with the procurement and senior staff of PMU. • Subsequently during project implementation, the record-keeping and documentation regarding procurement shall be monitored. • Implementing STEP will help record-keeping.	Moderate

Risk factor	Initial risk	Procurement strategy to mitigate the risk	Residual risk
Inadequate understanding of procurement procedures	High	• A procurement specialist to be recruited for the project who will be well aware of the public (World Bank) procurement procedures. • The key staff and all relevant officers of MEE will receive appropriate training for implementing procurement under World Bank–assisted projects. • The Bank will provide the Borrower with hands-on expanded implementation support for procurement because of experience capacity constraints.	Moderate
Inefficiencies and delays in procurement process	High	• Timeline to finalize the tenders/selections has been specified in the Procurement Plan. • Creation of PMU as a unit within MEE so that there are no delays in decision making. • Use of the procurement specialist in PMU. • Empowering the PMU and making it fully responsible for the entire procurement cycle from bid document preparation and invitation to contract signing.	Moderate
Insufficient competition in procurement	High	• Development of webpage for the project in MEE website; and publishing all tenders in the procurement section of the website. • For Requests for Qualifications (RFQ), Invitations for Quotation shall also be advertised in at least one widely circulated national daily newspaper or national gazette to increase the reach. • In RFQ, a minimum of three sealed quotations shall be obtained and must be opened in public in one location immediately after the deadline for the submission. In case three quotations are not obtained, the quotations shall not be opened; and the quotations must be called for again (in addition to advertising in the MEE website). In the event that, even after this repeated attempt, three valid quotations are not available, prior approval from Bank may be obtained to carry on the evaluation process with less than three quotations. • Publishing the General Procurement Notice (GPN) close to project launch in the regional and national newspapers. • Publishing all Specific Procurement Notices (SPNs) in the project website in addition to a national newspaper or national gazette. • Building-up the cost database. • Publishing the Procurement Plan, and specifications of equipment in the website early. • Agreement to disclose all contract awards on the project webpage. • Publishing list of purchase orders/ contracts placed using shopping procedure every quarter in the project webpage.	Moderate
Inadequate capacity of national consultants/ contractors/goods suppliers, which in some cases hinders designing appropriate qualification	High	**For Requests for Bids—open National** • Allowing JV in bid documents • Reasonable Qualification criteria shall be stated in the bidding documents, and if a registration process is required, a foreign firm declared as the lowest evaluated responsive bidder shall be given a reasonable time for registering, without let or hindrance; • Bidders will be allowed to bid in multiple currency.	Substantial

Risk factor	Initial risk	Procurement strategy to mitigate the risk	Residual risk
requirements as per Bank's Standard Bidding Documents for Goods and Works		**For RFQ** • Bidders allowed to bid in multiple currency so that the foreign companies can also bid. • These arrangements will allow and encourage the international companies to bid in in multiple currency.	
Contract management	High	• Pre-dispatch and post-dispatch inspections will be undertaken. • A detailed quarterly report of all the ongoing contracts including status of contract management issues such as delays, payments, etc., will be submitted by the Procurement Cell to the Project Director for review. • Implementing STEP.	Substantial
Fraud and corruption risks (including collusion and outside interference) in contracting process	High	• Measures to improve competition, such as broad technical specifications, realistic post qualification criteria, appropriate contract packaging. • Better disclosure, complaint handling, management information system (MIS), documentation. • Training in detecting fraud and corruption indicators to PMU staff by hiring a consultant with requisite skills by the PMU.	Substantial
Weak complaint redress mechanism	High	• A complaint handling mechanism given in the bank regulations shall be followed. • A six-monthly report of all complaints received and action taken will be submitted to the Project Director for review.	Moderate
Corruption in procurement	High	• Disclosure of contract opportunities, contract award decisions, internal/external procurement and financial audits.	Substantial
Overall Risk	**High**		**Moderate**

38. In view of limited procurement capacity and the decentralized nature under the proposed project, the overall risk for procurement prior to discussion and agreement of the procurement strategies and risk mitigation measures was **high**. After mitigation measures are agreed, the residual risk will be **moderate**.

39. As a departure from the general norm, invitations for bids for National competition for works and goods instead of being advertised in at least one widely circulated national daily newspaper may also be advertised in the national gazette.

Disclosure

40. The following documents shall be disclosed on the MEE website (i.e., the project webpage): (a) procurement plan and updates; (b) specification for goods and equipment as soon as these are prepared; (c) invitation for bids for goods and works for all (national and international) as well as RFQ method; (d) request for expression of interest for selection/hiring of consulting services; (e) contract awards of goods and works procured using International Competitive Bidding (ICB) and National Competitive Bidding (NCB) procedures; (f) list of contracts/purchase orders placed by PMU using shopping procedure on a quarterly basis; (g) shortlist of consultants; (h) contract award of all

consultancy services including individual consultants;(i) list of contracts following Direct Selection (DS) on a quarterly basis; and (j) action taken report on the complaints received on a half yearly basis.

41. The following details shall be sent to the Bank for publishing in the DgMarket and United Nations Development Business: (a) invitation for bids for procurement of goods and works using ICB procedures; (b) request for expression of interest for consulting services with estimated cost more than US$200,000; (c) contract award details of all procurement of goods and works using ICB procedure; (d) contract award details of all consultancy services with estimated cost more than US$200,000; and (e) list of contracts/purchase orders placed following DS or Selection Based on Consultants' Qualifications (CQS) procedures on a quarterly basis.

Agreed procurement arrangements

42. The Borrower has developed a Procurement Plan, which was reviewed at appraisal. For each major contract to be financed by the Bank, the different procurement methods or consultant selection methods, the need for prequalification, estimated costs, prior review requirements, and timeframe are specified in the agreed Procurement Plan. The Procurement Plan will be updated in agreement with the Bank's task team annually or as required to reflect the actual project implementation needs and improvements in institutional capacity.

Procurement skills

43. All procurement will be carried out at the PMU, which will be responsible for overall procurement oversight under this project. A procurement manager will be specially recruited for the PMU and will manage all procurement in the project on a full-time basis. That individual will have experience in procurement in projects financed by international agencies and may be supported by other relatively junior procurement staff. The procurement manager and procurement support staff will receive appropriate training for implementing procurement activities using Bank procurement guidelines.

Methods of procurement

44. The methods of procurement indicated in Table 16 shall be used for procurement under the project.

Table 16: Procurement methods to be used in the project

Expenditure category	Contract value (threshold)	Procurement method	Contracts/processes subject to prior review
Goods	>= US$ 100,000	Open International	All contracts over US$ 4 million
	< US$ 100,000	Open National	All contracts subject to post review
	<= US$ 25,000	Quotation	All contracts subject to post review
	No threshold	DC	All contracts
Works	>= US$ 1,000,000	Open International	All contracts over US$ 15 million
	< US$ 1,000,000	Open National	All contracts subject to post review
	<= US$ 50,000	Quotation	All contracts subject to post review
	No threshold	DS	All contracts

Consulting Services (firms)	>= US$200,000	All competitive methods except CQS [Advertise internationally]	All contracts above 2 million USD
	< US$200,000	All competitive methods. [Advertise locally]	All contracts subject to post review
	< US$300,000	CQS	All contracts subject to post review
	-	DS	All contracts
Individual consultancies	-	IC	All contracts over US$300,000/- equivalent
		IC- DS	All contracts

Notes:

1. Prior review by the Bank for works and goods*:* First Open International Contracts and the first open national contract of works and goods from PMU subsequent contracts above US$15 million for works and US$4 million and above for goods; and all contracts awarded on direct contracting method will be subject to prior review by the Bank. It was agreed that one sample bidding document will be agreed with the Bank for each type of package and the bidding documents, including those under post review, will be prepared according to this agreed sample. The clauses that will need modifications will also be agreed with the Bank.
2. Prior review by the Bank for consultancy services: First contract of any value from PMU; subsequent contract valued over US$2 million equivalent for firms, and above US$ 400,000/- equivalent for individuals; all contracts to be awarded on Direct Selection basis irrespective of value will be subject to prior review by the Bank.
3. Post Review by the Bank: All contracts not covered under prior review will be subject to post review during supervision missions, and/or review by consultants to be appointed by the by Bank. The normal Bank requirement of procurement post review of 15% of the contracts for a project with a risk rating of **substantial risk** will be followed.
4. Procurement Review by MEE: Independent review or audit will be undertaken for the project for MEE's own internal due diligence, and as agreed in the implementation arrangements for the project. PMU will hire an independent agency for carrying out financial audit, based on terms of reference acceptable to the Bank. A part of the activities of the consultant will include carrying out post review of the contracts awarded by the PMU. The report submitted by the consultant will be part of the quarterly progress reports. The internal auditor appointed by the PMU will conduct the audit PMU. In case there is any procurement related observation made by the internal auditor in their audit report, the same shall be shared with Bank along with the comments of PMU.
5. Frequency of procurement supervision: Given the constraints and the risk involved, a minimum of two supervision missions a year is planned. In addition to supervisions missions, the Bank will also carry out an annual ex-post review of procurement that falls below the prior review threshold.

Environmental and Social Safeguards

42. The project is categorized as an Environmental Category A, predominantly due to activities including construction of new SWM facilities or upgrading of SWM facilities, addressing the management of existing disposal sites, and the on-site treatment, management, and the final disposal of solid waste in proposed facilities, including final disposal facilities for more than 10 t/day of residual solid waste

at an RWMC, with environmental implications associated with both construction and operation of these facilities.

43. While the project activities themselves will help to curtail the major impacts associated with improper management of solid waste, there still remain significant risks associated with the establishment and operation of SWM facilities and final disposal of solid waste that need to be managed accordingly. In addition, there is also the uncertainty regarding the exact locations of a number of activities to be carried out under the project, and project interventions that will involve physical interventions to the environment, such as those that fall within the activities of Components 2 and 3.

44. The following safeguard policies are applicable to the proposed project:

    1. OP 4.01 (Environmental Assessment), to ensure any environmental impacts associated with project activities are identified in time and mitigated.

    2. OP 4.04 (Natural Habitats) is triggered because all of the country's islands are surrounded by coral reefs, which are significant natural habitats. The overall project will not conduct any activities within designated protected areas, and project interventions will help to mitigate pollution and degradation of such ecosystems due to inappropriate SWM.

    3. OP 4.12 (Involuntary Resettlement): Interventions leading to the construction and expansion of IWMCs could lead to future instances of involuntary loss of crop and/or land taking, because a small percentage of communities rely on surrounding land for agriculture and livelihood.

45. Component 3 will include the establishment of IWMCs and/or upgrading of existing IWMCs that will undertake intermediate treatment of SWM at the island level. Component 2 will involve the establishment of a possible new RWMC in Zones IV and V, and investments to optimize operation of the existing RWMC in Zone II. Sites for the establishment of IWMCs will be selected following preparation of IWMPs and respective feasibility studies, which will stipulate the appropriate technology and exact location and design of the IWMCs. These will then proceed with environmental screening and the preparation of either an ESIA or ESMP as per the screening criteria. The location and final disposal technology for the new RWMC facility will be identified during project implementation as part of the BPEO Study.

46. An ESAMF has been prepared by the government and will serve as a roadmap outlining the prerequisite environmental and social screening and assessments that will need to be undertaken for all project activities, as per the national environmental legislations of the Maldives and the Bank's OP4.01 and other safeguard policies triggered by the proposed project. The ESAMF also describes generic impacts, relevant mitigation measures, and an assessment of institutional capacity.

47. Based on lessons from MEMP, more stringent due diligence mechanisms have been included in the ESAMF for this project. All new construction contracts will not proceed prior to the clearance of environmental and social screening and corresponding assessments and management plans. To facilitate better ground-level monitoring and coverage across the project areas, the proposed project

will include a monitoring mechanism in the form of E&S officers at each project atoll. This arrangement is predominantly intended to build the level of technical support and increase the capacity of the Island Councils and contractors in managing safeguard issues.

48. The project ESAMF has been widely consulted and shared with all project stakeholders. An E&S coordinator has been seconded to the project from EPA from the preparatory stage and will continue on to project implementation, in comparison to the original project. To ensure that any legacy issues on islands (such as handling existing dumping and burning) are fully managed, the feasibility studies and island waste management planning that are built in to the project design will propose site-specific guidance on management actions. In addition, the ESAMF also includes clear guidelines on the management and closure of existing residual waste sites, management of collected recyclables, and actions to curtail open burning.

49. Due diligence measures focusing on the new RWMC will include a standalone ESIA for the proposed site and technologies, as per a detailed ToR which has been presented in the ESAMF. The ESIA will be conducted once the location and design for the facility have been finalized via the feasibility studies and BPEO study which are part of the project. In addition, the ESAMF also outlines a framework for due diligence measures to be taken at all steps of project implementation, including stringent environmental management and monitoring of the IWMCs and RWMC at the operational phase. Operations are required to be in line with national guidelines as well as the World Bank Group Environmental, Health and Safety Guidelines; General and sector-specific SWM which have been stipulated in the ESAMF.

50. Under Components 2 and 3, activities in Zone II will include provision of equipment, augmentation of storage facilities, and access roads on the site at the existing RWMC established under MEMP. A site-specific full Environmental and Social Assessment has already been completed for this RWMC and has been cleared by IDA. This ESIA and ESMP for the Zone II RWMC will remain valid as it takes into account all the additional proposed investments. For the IWMCs in the MEMP region, Environmental and Social Assessments have already been completed, taking into account the IWMPs. During implementation of MEMP, the key environmental impacts have been mitigated and managed well, and the implementing agencies managed to ensure that no significant safeguard issues were present during construction work or as a result of the project. Therefore, the same safeguard instruments, which include ESMPs for each respective IWMC in Zone II, will remain valid for the period of the proposed project. As the proposed project will only be providing vehicles and equipment, which were included in the original design, relevant impact management is covered under the management of operational aspects under the corresponding ESMPs. While the instruments will be the same, monitoring and reporting will be conducted in line with the measures outlined in the ESAMF of the proposed project.

51. The project does not envisage any significant adverse social impacts. However, the interventions leading to the construction and expansion of IWMCs could lead to future cases of involuntary loss of crops and land, as a small percentage of communities rely on surrounding land for agriculture and

livelihood. As a result, an RPF has been prepared as part of the ESAMF in line with the Bank's OP4.12 on Involuntary Resettlement. Potential positive impacts during construction phase include increased employment opportunities in the construction sector. While the construction of IWMCs is likely to be sourced locally, the construction of the new RWMC (requiring skilled labor) may involve the use of expatriate/migrant/non-local labor, however, no influx is expected as the works are small and phased. It is also likely that the new RWMC will be built on an uninhabited island where there is no host community. Positive socio-economic impacts can also be expected during the operational phase, including creation of new employment opportunities in relation to operation of the RWMCs, IWMCs, and waste transport vessels.

52. The associated costs of implementing the ESAMF have been integrated into the project budget. The project will ensure that all works contracts will include the ESMPs, and the cost of implementing the ESMPs will be identified as an item in the Bill of Quantities.

53. The PMU and Island Councils, will establish a grievance mechanism to receive and facilitate resolution of the affected communities' concerns and issues about the PMU's environmental and social performance during project implementation. All respective ESMPs will establish a mechanism for promptly addressing any concerns raised, which will be readily accessible to all segments of the affected communities, at no cost and without retribution as outlined in the project ESAMF.

54. The project PMU includes an E&S coordinator who will play a central role of managing safeguard requirements and the implementation of the ESAMF for the proposed project. A team of E&S officers will be posted in each of the project atolls in Zone IV and V and report to the E&S coordinator. He/she will report to the project manager and work closely with the assigned team, Island Councils, and EPA. The E&S coordinator and team will be responsible for ensuring the overall implementation of the ESAMF and will also liaise with other agencies, contractors, and engineering supervisors at the island level to implement safeguard mitigation measures. The EPA, as the main environmental regulator, will work closely with the PMU, providing clearance and guidance on technical requirements for respective safeguard assessments by issuing specific ToRs, reviewing safeguard documents that require their clearance, and also ensuring that the needs for operational monitoring are well incorporated in the project. The project will provide training in environmental management and on environmental and social management to the MEE PMU staff, WMD, EPA, Island Councils, and contractors to improve institutional capacity. The cost of monitoring and supervising the implementation of environmental and social project regulations has been integrated into the overall project investment cost.

55. Public consultations were held with affected stakeholders at Island and Atoll Council levels during the preparation of ESAMF in November 2016. In addition, the draft ESAMF was disclosed on the MEE website on November 18, 2016. Further consultations will be undertaken as part of the feasibility studies and assessments. These should be duly documented in the respective outputs of the studies. In addition, the technical coordinators, E&S coordinator, and the island-level officials will be required to undertake continuous consultations with stakeholders and report as part of safeguards monitoring.

As part of the ESAMF, guidance on preparing an entitlement framework has been provided. All revised documents related to safeguards were disclosed in-country through the MEE website (*http://www.environment.gov.mv/v1/download/1415*) and the World Bank's Info Shop (*http://www.worldbank.org/projects*) on February 1, 2017. As soon as the project commences implementation, the project is expected to have regular consultations with local stakeholders on environmental and social issues.

Monitoring and Evaluation

56. Monitoring and evaluation of outcomes and results are an integral part of the project design. The PMU will collect and present data and reports for six-monthly reviews by the Project Board/Steering Committee in conjunction with World Bank implementation support missions, so that progress toward achieving the PDO is measured and corrective actions are identified in time as may be required. Discussions during implementation support missions related to institutional capacity building, financial viability, technical reviews, and site visits will also provide effective means of monitoring progress. In addition, the Project Board will continuously monitor performance of the PMU itself, so that protracted delays due to lack of proactivity of the PMU can be avoided.

57. The project will undertake two independent evaluations through selected independent expert consultants. One evaluation will occur prior to the mid-term review of the project, and another will be undertaken six months prior to closing the project. These evaluations will be augmented by annual opinion surveys of beneficiaries of the project.

58. The PMU will have primary responsibility for M&E of the PDO-level and intermediate results indicators. To this end, an M&E specialist will be hired full time by the PMU and will be responsible for working closely with the participating Island and Atoll Councils that will generate the primary data at source and submit the periodic reports. The proposed project will finance the necessary equipment (such as weigh bridges and stations), management information systems, and training that will allow the required data to be generated and suitably managed and enable production of the required reports. *The Results Framework can be found in Annex 1*. All efforts will be made to integrate the project's M&E arrangements with the existing systems developed under MEMP. Adequate project funds have been allocated under Component 4 for the M&E activities during implementation.

Annex 4: Implementation Support Plan

Strategy and Approach for Implementation Support

1. The overall aim of the Implementation Strategy is to devise effective ways of dealing with project risks in a timely manner. The Bank's emphasis on open and direct communication among stakeholders underpins the strategy, with additional focus on the nuances of decentralized implementation of the island-based component. The strategy is flexible enough to accommodate the specific issues that may turn up as implemenation progresses and the regional facility begins to be finalized. These features of the strategy will remain crucial for the project during its implementation.
2. The implementation support strategy for the project uses arrangements that provide support to the government by facilitating timely and effective supervision and monitoring of project activities. These arrangements include: (a) formal missions; (b) technical meetings and visits by the World Bank, between the formal implementation support missions; (c) periodic feedback from PMU based on its monitoring of activities and targets vis-à-vis the Results Framework; and (d) internal audit and FM reporting.
3. Implementation support in the first year will focus on: (a) completion of procurement of key contracts, such as the feasibility study for the RWMC and BPEO study, as well as work on islands with approved IWMPs; (b) setting up systems for project monitoring, including project reporting templates, M&E formats, setting up the project fund flow processes, and FM reporting templates; (c) getting PMU staff trained to use the Bank's procurement, FM, and safeguard systems and policies; and (d) full operationalization of facilities at Vandhoo and in the islands in Zone II.
4. The project has to undertake significant procurement, based on technical and engineering studies. In addition, because the PMU is new, it will require FM and procurement systems to be supported to fully cater to the project needs. Specialist skills for SWM, with an emphasis on technical expertise, will be required to support the project. The current assessment of the project needs indicates that the following skills will be required during the life of the project: procurement management; civil construction management; social mobilization, gender, and safeguards management; environmental safeguards and management; SWM system expert; M&E expert; and an expert in outreach and communication. Short, focused support will also be required from higher education and contract/project management experts to support specialized activities during all years of project implementation.

Implementation Support Plan

5. The various activities needed for implementation support would require the resources described in the following tables.

Table 17: Main focus of implementation support

Time	Focus	Skills needed
First 12 months	• Completion of procurement for key contracts, including review of ToRs and designs, and initiation of selected works and studies • Setting up FM and disbursement systems • Development of project management and M&E manuals and systems	• TTL(s)/Project Management • Procurement • FM/Accounting • Solid Waste Management Expert • Environmental Specialist • Social Specialist (specialization in Community Mobilization and Gender issues) • Expert on M&E • Contract Management/Civil construction
13–72 months	• Procurement of contracts for components identified for later phases • Review and finalization of designs • Initiation of selected works and studies • Contract management • Project management • M&E • Environmental monitoring • Preparing long-term plans for the fisheries sector and related value chains	In addition to all of the above skills in Year 1, technical skills in the following areas: • Solid Waste Management Policy • Higher Technical Education • Economics of small island public services • Communications and Outreach

Table 18: Skill mix required for implementation support

Skills needed	Number of staff weeks	Number of trips	Comments
TTL/Co-TTL/ Project Management	20 weeks per year	4 trips per year	Full time, including technical visits
Procurement	15 weeks per year	4 trips per year	Half-time of consultant (4 trips in Year 1); 25% of staff time
FM	4 weeks per year	2 trips per year	Providing support in FM due diligence of the project
Solid Waste Management Expert	10 weeks per year	3 trips per year	Full time, including technical visits
Construction/Civil Works Management	8 weeks per year	2 trips per year	Full time, including technical visits
M&E Expert	6 weeks per year	2 trips per year	Setting up systems and analysis of reports received from PMU
Environmental Safeguards	4–6 weeks per year	2 trips per year	Monitoring environmental due diligence and compliance
Social Development Specialist (Community Mobilization and Gender)	6 weeks per year		Supporting organization of the atoll communities, councils, and working with the household-level outgrower farms to convert them into successful business ventures
Communication Specialist	4 week per year	2 trips per year	Document project; provide guidance on citizen engagement, and beneficiary surveys

Annex 5: Greenhouse Gas Emissions Impact

Project Boundary

1. Activities for which Greenhouse Gas (GHG) impact was assessed include (1) the increase in truck and boat travel associated with improved waste collection and (2) improvement of waste disposal through composting and incineration. The project activities will occur in Zones II, IV, and V of the Maldives and cover 87 islands.

Methodology

2. The tools used for GHG accounting were:
   - CURB: Climate Action for Urban Sustainability – Waste Disposal.
   - Institute for Global Environmental Strategies (IGES) GHG Calculator for Solid Waste – Waste Collection and Transport.

Baseline Scenario

3. Waste generation is expected to rise at the population growth rate. With no project intervention, this growth would impact the amount of waste disposed of through ocean dumping and open burning. The waste generation rate would also incrementally increase the amount of fuel used for the transportation of waste. The estimated 2016 base year waste generation rate is calculated to be 996 t per year for resorts, and 22,601 t per year for the resident population in Zones II, IV, and V for a total of 23,596 t per year.
4. Waste would continue to be disposed of as follows: 50% ocean dumping (no emissions accountable) and 50% open burning.
5. Waste collection is facilitated by 2 boats in Zone II and 2 boats in Zones IV and V. Additionally, it is assumed that 15% of the 87 inhabited islands in the 3 zones currently use 1 garbage truck (13 trucks). It is assumed that trucks currently travel 2 km per day (the length of an island is ~1 km) and together consume 190 liters of fuel per month. It is also assumed that boats currently travel 5 km per day (a longer distance to account for greater distance between islands) and together consume 3,112 liters of fuel per month, given the higher distance and lower fuel efficiency of boats.

Data sources

6. Data for waste composition, collection, and disposal were obtained from the MEE and ICs and background data from the Bank Team. Population growth rates were obtained from the United Nations Population Division, Department of Economic and Social Affairs, 2015 edition. Fuel efficiency data were obtained from the Energies Journal and the USA Oak Ridge National Laboratory.

Key Assumptions

7. Activities in Zones II, IV, and V were accounted for based on the project scope. There are 87 inhabited

islands in these zones.

8. The waste generation rate assumed for residents was 0.8 kg/person/day. Zone II population was assumed to be 42,400. The combined Zone IV and V population was assumed to be 35,000. This resulted in a total annual residential waste generation of 22,601 t per year. Resort waste generation was assumed to be 3.5 kg/person/day. The affected zones were assumed to host 30 out of the 116 total resorts and a proportional share of the 1,100,000 tourist nights. This results in an annual waste generation rate of 996 t per year.

9. The waste composition was assumed to be 66.1% organics, 4.3% paper/cardboard, 2% glass, 5.3% plastics, 0.9% metals, and 21.4% other (including 8.3% hazardous and infectious waste).

10. To estimate the growth in fuel consumption in relation to increased transportation needs, increased collection rates, and improved fuel efficiency, a few assumptions were made:

    - The number of trucks will increase from 13 (assuming 15% of islands currently use a small waste collection truck) to 45. The growth is due to the addition of 15 trucks at IWMCs (as stated in this PAD), and 1 additional truck for 20% of islands as waste collection is improved (17 trucks). All trucks are assumed to travel ~2 km per day on their island and distance is not expected to increase substantially. Therefore, fuel consumption increases are driven by the increase in the number of trucks.
    - There are currently 2 boats transporting waste for Zone II and 2 boats in Zones IV and V. It is assumed that while boats currently travel 5 km per day (that is, 10 trips at ½ mile per trip between islands), the distance travelled will triple in the future scenario given improved waste collection. As stated in this PAD, boats can account for 30–50% of total fuel costs, so it is assumed that the number of trips will increase, but not so dramatically as to account for needed efficiency measures associated with increased collection.
    - The fuel efficiency for a small truck is assumed to be 0.25 liters per km. The fuel efficiency for boats is assumed to be 5.12 (this assumes a moderately-sized boat as consistent with this PAD). Fuel efficiency is lower for the boat, given the high fuel consumption of travel in the ocean by boat, accounting for drag and waves.

11. It is assumed that future waste amounts and annual fuel consumption would grow year-over-year by the population growth rate, which was calculated through United Nations population projections from 2016 to 2066.

12. It is assumed that 50% of waste will be collected and then treated using controlled methods. Waste disposal in Zone II is expected to shift toward incineration and composting of waste. The collected portion of waste will be equally composted/incinerated in the future state, based on the PAD indicators. In Zones IV and V, the waste treatment method is not yet determined, but composting 50% of the waste was a stated goal. Since there is not yet a clear picture of the waste treatment method, an estimated aggregate waste treatment distribution across all generated waste in the 3 zones was made, including 15% incineration and 30–50% composting depending on the waste treatment options

available to the specific waste type. The remaining 50% of the waste will use the same disposal methods as used currently. In the CURB tool, recycling was used as a baseline proxy disposal method in lieu of ocean dumping, since both recycling and ocean dumping are assumed to be emissions neutral.

13. CURB tool defaults were used for emissions factors based on national-level data from the International Energy Agency (2012).

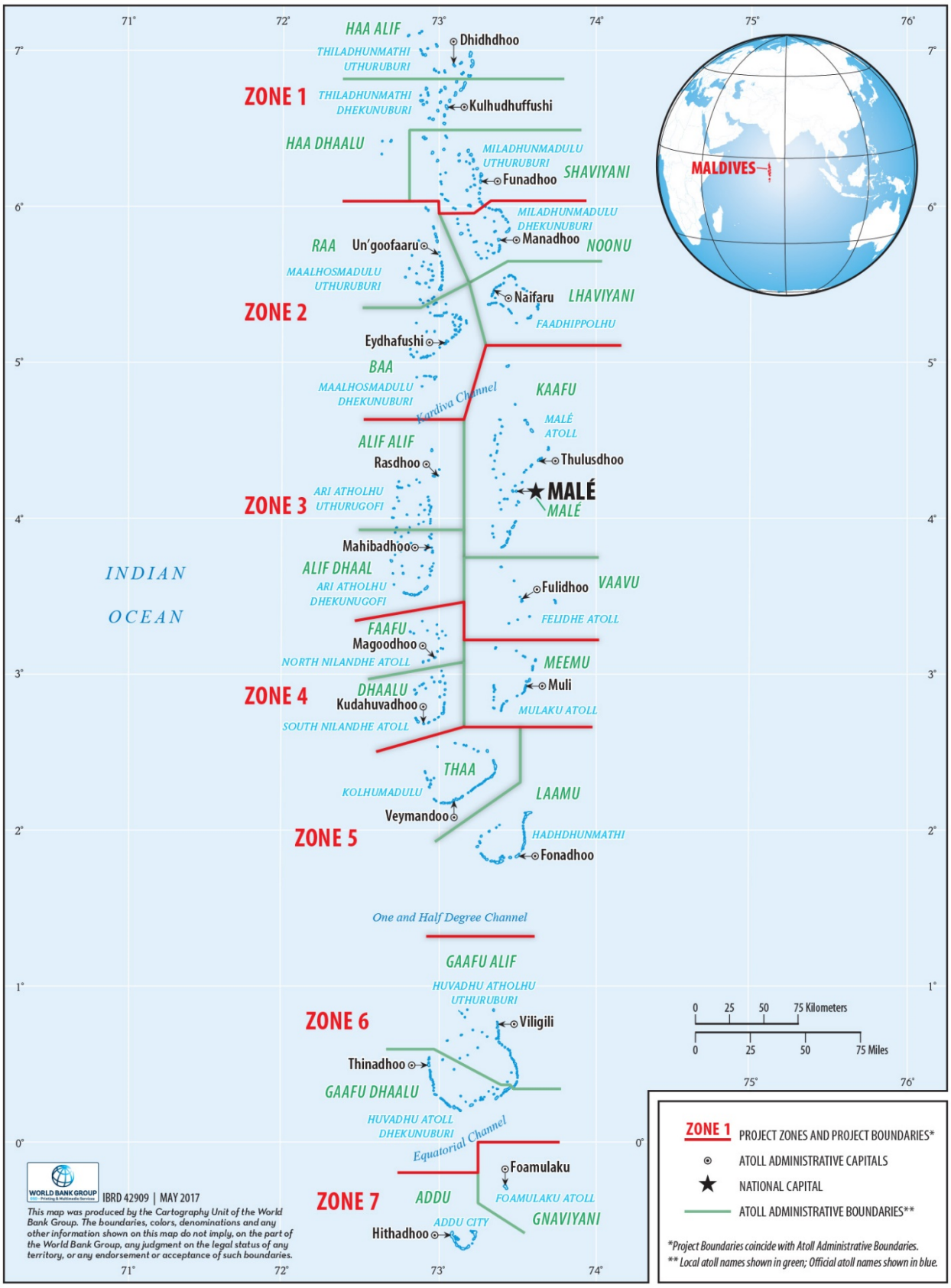
Results

14. An economic lifetime of 20 years is assumed for the planned investments. Results are displayed in Table 19.

Table 19: Summary of analytical results

Summary	Disposal	Transport	Total
Gross emissions (tCO_2e)	112,615	5,000	**117,615**
Net emissions (tCO_2e)	30,930	2,601	**33,531**
Average annual emissions (tCO_2e)	5,631	250	**5,881**

Annex 6: Project Map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6°
5°
4°
3°
2°
1°
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HAA ALIF
THILADHUNMATHI UTHURUBURI
Dhidhdhoo
ZONE 1
THILADHUNMATHI DHEKUNUBURI
Kulhudhuffushi
HAA DHAALU
MILADHUNMADULU UTHURUBURI
Funadhoo
SHAVIYANI
MILADHUNMADULU DHEKUNUBURI
Manadhoo
NOONU
RAA
Un'goofaaru
MAALHOSMADULU UTHURUBURI
Naifaru
LHAVIYANI
ZONE 2
FAADHIPPOLHU
Eydhafushi
BAA
MAALHOSMADULU DHEKUNUBURI
Kardiva Channel
KAAFU
MALÉ ATOLL
ALIF ALIF
Rasdhoo
Thulusdhoo
MALÉ
ZONE 3
ARI ATHOLHU UTHURUGOFI
MALÉ
Mahibadhoo
ALIF DHAAL
ARI ATHOLHU DHEKUNUGOFI
Fulidhoo
VAAVU
FELIDHE ATOLL
FAAFU
Magoodhoo
NORTH NILANDHE ATOLL
MEEMU
Muli
ZONE 4
DHAALU
Kudahuvadhoo
MULAKU ATOLL
SOUTH NILANDHE ATOLL
THAA
KOLHUMADULU
LAAMU
Veymandoo
ZONE 5
HADHDHUNMATHI
Fonadhoo
One and Half Degree Channel
GAAFU ALIF
HUVADHU ATHOLHU UTHURUBURI
ZONE 6
Viligili
Thinadhoo
GAAFU DHAALU
HUVADHU ATOLL DHEKUNUBURI
Equatorial Channel
Foamulaku
ZONE 7
ADDU
FOAMULAKU ATOLL
GNAVIYANI
ADDU CITY
Hithadhoo
INDIAN OCEAN
MALDIVES
0 25 50 75 Kilometers
0 25 50 75 Miles
ZONE 1 PROJECT ZONES AND PROJECT BOUNDARIES*
ATOLL ADMINISTRATIVE CAPITALS
NATIONAL CAPITAL
ATOLL ADMINISTRATIVE BOUNDARIES**
*Project Boundaries coincide with Atoll Administrative Boundaries.
** Local atoll names shown in green; Official atoll names shown in blue.
WORLD BANK GROUP
IBRD 42909 | MAY 2017
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