



**ASIAN INFRASTRUCTURE  
INVESTMENT BANK**

PD000278-MLD  
September 10, 2020

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**Project Document  
of the Asian Infrastructure Investment Bank  
Sovereign-backed Financing  
Republic of Maldives  
Greater Malé Waste-to-Energy Project**

## Currency Equivalents

(As at July 29, 2020)

Currency Unit – Maldivian Rufiyaa (MVR)

MVR1.00 = USD0.064893

USD1.00 = MVR15.41

## Borrower's Fiscal year

Jan. 1 – Dec. 31

## Abbreviations

ADB	Asian Development Bank
AIIB	Asian Infrastructure Investment Bank
CBA	Cost Benefit Analysis
CDW	Construction and Demolition Waste
MSW	Municipal Solid Waste
DBO	Design, Build, and Operate
EIA	Environment Impact Assessment
ELV	End-of-Life Vehicle
EMP	Environmental Management Plan
EPA	Environment Protection Agency
ESP	Environmental and Social Policy
GHG	Greenhouse Gases
GOM	Government of Maldives
GRM	Grievance Redress Mechanism
IAM	Independent Accountability Mechanism
IsDB	Islamic Development Bank
JFJCM	Japan Fund for Joint Crediting Mechanism
MOE	Ministry of Environment
MOF	Ministry of Finance
MPA	Marine Protected Area
NCBP	Non-concessional Borrowing Policy
PMU	Project Management Unit
PPM	Project-affected People's Mechanism
PPMS	Project Performance Management System
SPS	Safeguard Policy Statement
STELCO	State Electric Company Limited
TA	Technical Assistance
TPD	Tons per day
WAMCO	Waste Management Corporation Limited
WTE	Waste to Energy
3R	Reduce, Reuse, and Recycle

## Contents

<b>1. Summary Sheet .....</b>	<b>1</b>
<b>2. The Project Description.....</b>	<b>3</b>
A. Rationale .....	3
B. Project Objective and Expected Results .....	6
C. Description and Components .....	6
D. Cost and Financing Plan .....	7
E. Implementation Arrangements .....	8
<b>3. Project Assessment .....</b>	<b>10</b>
A. Technical .....	10
B. Economic and Financial Analysis .....	12
C. Fiduciary and Governance .....	13
D. Environmental and Social .....	14
E. Risks and Mitigation Measures .....	17
 <b>Annexes</b>	
Annex 1: Results Monitoring Framework .....	21
Annex 2: Detailed Project Description .....	22
Annex 3: Economic and Financial Analysis .....	25
Annex 4: Sovereign Credit Fact Sheet.....	32

## 1. Summary Sheet

### Republic of Maldives Greater Malé Waste-to-Energy Project

Project No.	PD000278-MLD
Borrower	Republic of Maldives
Project Implementation Entity	Ministry of Environment
Sector Subsector	Environmental Management Solid Waste Management
Project Objective	The main objective of the project is to establish a regional solid waste treatment system in the Greater Malé region.
Project Description	<p>The project will establish a sustainable regional solid waste treatment system in the Greater Malé region. The project is designed to reduce disaster risk and improve climate change resilience while creating a cleaner environment and reducing greenhouse gas emissions. The project has the following two components:</p> <ul style="list-style-type: none"> <li>• <b>Component 1</b> - Establishment of climate resilient regional waste management facility, including construction of a 500-ton per day (tpd) Waste-to-Energy (WTE) plant with flue gas treatment, emissions monitoring, bottom ash processing plant, and ash disposal landfill with leachate treatment ponds.</li> <li>• <b>Component 2</b> - Institutional capacity building in sustainable waste management, environmental monitoring, and public awareness.</li> </ul>
Implementation Period	Start Date: October 2020 End Date: September 30, 2026
Expected Loan Closing Date	March 31, 2027
Cost and Financing Plan	<p>Total project cost: USD151.13 million</p> <p><u>Financing Plan:</u></p> <ul style="list-style-type: none"> <li>- AIIB loan: USD40.00 million</li> <li>- ADB loan: USD38.21 million</li> <li>- ADB grant: USD35.18 million</li> <li>- Japan Fund for the Joint Crediting Mechanism (JFJCM) grant: USD10.00 million</li> <li>- Government: USD27.74 million</li> </ul>
Size and Terms of AIIB Loan	<p>USD40 million.</p> <p>The loan will have a final maturity of 31 years, including a grace period of seven years, and will be made on standard FSL terms for sovereign-backed loans, with the corresponding average maturity.</p>

Co-financing (Size and Terms)	Joint co-financing with ADB and JFJCM (ADB-administered Japanese trust fund), - ADB concessional loan: USD38.21 million - ADB grant: USD35.18 million - JFJCM grant: USD10.00 million
Environmental and Social Category	Under ADB Safeguard Policy Statement, Category A for environment, Category C for Involuntary Resettlement and Category C for indigenous Peoples- (Equivalent to Category A if AIIB's Environmental and Social Policy were applicable).
Risk (Low/Medium/High)	High
Conditions for Effectiveness	1. The Loan/Grant Agreement (including JFJCM grant) between the Borrower and ADB has been executed and is effective; and 2. Co-Lenders' Agreement between AIIB and ADB has been executed.
Key Covenants/Conditions for Disbursement	The Borrower shall make available, through budgetary allocations or other means, all funds required to ensure effective operation and maintenance of the Project facilities, both during and after completion of the Project, in accordance with the O&M Financing Plan.
Policy Assurance	The Vice President, Policy and Strategy, confirms an overall assurance that AIIB is in compliance with the policies applicable to the project.

President	Jin Liqun
Vice President, CIO	D.J. Pandian
Director General	Rajat Misra (Acting)
Manager	Rajat Misra
Team Leader	Toshiaki Keicho, Sr. Investment Operations Specialist-Urban
Team Members	Gregor Herda, Investment Operations Specialist Irish Fe Aguilar, Social Development Specialist Zhixi Zhu, Environmental Specialist Jurminla Jurminla, Procurement Specialist Shonell Robinson, Financial Management Specialist Haiyan Wang, Sr. Finance Officer Mengmeng He, Finance Associate Jana Halida Uno, Sr. Operational Policy Specialist Ankur Agrawal, Young Professional Antong Hu, Administrative Assistant

## 2. The Project Description

### A. Rationale

1. **Country Priority.** The Maldives is an island state comprising nearly 1,200 coral islands grouped into 26 atolls, spread across roughly 90,000 square kilometers of the Indian Ocean. The Maldivian population, about 557,426 as of 2020, is widely dispersed across 188 inhabited islands, many of them remote, and physically vulnerable to rising sea levels. Eighty percent of the total land area of the country, which is less than 300 square kilometers, is lower than 1 meter above mean sea level. The country's exposure to natural hazards and climate variability poses a threat to lives and the economy. The economy is dependent on a small number of sectors, with tourism contributing over 50% directly and indirectly. The high share of tourism in the economy is both a strength and a limitation. The rapid rise in economic standards and living conditions in the Maldives over the last three decades has been driven by fast growth in tourism. However, it also makes the Maldivian economy highly vulnerable to fluctuations in global economic turmoil through their effects on tourism and the direct and indirect transmission of these effects to other sectors.

2. The Greater Malé region and its outer islands suffer from severe environmental pollution and deteriorating livability because of the inadequate collection and haphazard disposal of solid waste. The project area encompasses the 35 inhabited islands of the Alifu Alifu Atoll, Alifu Dhaalu Atoll, Kaafu Atoll, and Vaavu Atoll, including the capital city of Malé, with a total population of 227,485 (2020), which is 41% of the Maldives' total population. The Government of Maldives (GOM) targets to achieve efficient public spending on economic and social services in the Greater Malé region as part of its national strategy. Waste management systems in Greater Malé and its inhabited outer islands are currently neither equipped to handle the projected growth nor the volume of solid waste generated at present. Open dumping and burning of garbage at the 30-year-old, 10-hectare dumpsite on Thilafushi Island (six kilometers from Malé) is creating an environmental and public health hazard. Plumes of smoke visible from Malé, the international airport, and surrounding resorts compromise air quality and pose a daily nuisance to residents and tourists, while toxic leachate is contaminating soil and seawater.

3. The increasing pressure on an already stressed waste management system poses a significant threat to tourism and fisheries, both of which are cornerstones to Maldives' economy and rely heavily on the country's pristine environment. Poor communities on the outer islands suffer from accumulated garbage as they have limited awareness and capacity to manage solid waste effectively. Moreover, the Maldives' dependence on costly diesel power, as well as the associated carbon emissions justify consideration of alternative and less polluting energy sources.

4. **Institutional Context.** The government's Strategic Action Plan 2019–2023 recognizes Solid Waste Management as the most visible and pressing environmental issue at present and details policy actions to promote waste as a valuable resource in the country, including establishment of regional waste management facilities and Waste-to-Energy plants. Improving waste management in the Greater Malé region is also a top priority in the Strategic Action Plan.

In 2019, GOM established the Maldives Green Fund<sup>1</sup> to enhance investments in environmental improvement, including solid waste management. Financing Plan for operations and maintenance (O&M) of waste management services, including clear responsibilities, revenue enhancement measures and fund flows will need to be established to ensure service sustainability over the long term.

5. The Waste Management and Pollution Control Department in the Ministry of Environment (MOE) is mandated to ensure safe waste disposal on all inhabited islands, while the Environmental Protection Agency (EPA) is responsible for regulatory activities for waste management and pollution prevention. Waste Management Corporation Limited (WAMCO), operational since January 2016, is the state-owned operator charged with collecting and transporting waste, as well as managing the regional waste management facilities throughout the country. Waste collection in the outer islands is the responsibility of island councils. WAMCO has limited professional experience in modern and efficient waste collection systems, and this lack of technical and managerial skills undermines their performance. While WAMCO is trying to improve collection, the company receives more than 150 complaints per day for non-collection of waste (as of September 2017). Its collection equipment includes a fleet of aging vehicles unable to access narrow streets. WAMCO does not have uniform refuse bins or formal transfer stations. Waste is transported to Thilafushi Island in open, non-containerized vessels, resulting in significant spillage into the ocean.<sup>2</sup> Since 2008, fires have been deliberately set at the dumpsite to reduce growing mounds. The equipment and logistics at the site are inadequate to manage incoming waste efficiently and maximize the use of limited space. Construction and demolition waste and end-of-life vehicles (ELVs) are not collected and processed separately. Household surveys in the project area show high demand for “reduce, reuse, recycle” (3R) awareness and education programs. The project area generated the estimated 836 tons per day (tpd) of mixed solid waste in 2019<sup>3</sup>. With rapid urbanization and tourism development in the region, the amount of waste is projected to grow to more than 1,000 tpd by 2027.

6. **Strategic fit for AIIB.** The project aligns with the Bank’s strategies as follows:

- (i) Sustainable Cities Strategy: by improving basic infrastructure and city resilience through better access to, and improved efficiency of, basic infrastructure and services; reducing pollution, incorporating low-carbon elements and protecting the urban environment; and enhanced resilience against climate change and natural disasters.
- (ii) Energy Strategy: by promoting energy access and security, reducing the carbon intensity of energy supply, and managing local and regional pollution.

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<sup>1</sup> Maldives Green Fund (MGF) was established in January 2019 as a trust fund under Public Finance Act (Law number 3/2006). MGF revenues are from Green Tax, which is payable by tourists who stay in resorts, hotels and tourist vessels at the rate of USD6 per day of stay and in tourist guesthouses at the rate of USD3 per day of stay. For the year 2019, the government received MVR 851 million (USD55 million) in Green Tax. Source: Government of Maldives.

<sup>2</sup> Government of Maldives, Ministry of Environment and Energy. 2016. *State of the Environment, 2016*. Malé.

<sup>3</sup> Breakdown of solid waste by type is as follows: construction and demolition (68%), household (19%), resort (6%), commercial (3%), airport (1.2%), industrial (0.8%), market (0.3%), hazardous (0.2%), and end-of-life vehicles (0.1%). Municipal waste composition is as follows: organic (53%), paper and cardboard (12%), plastic (11%), hazardous (medical) waste (8%), metal (3%), glass (3%), and others (11%).

7. The project is also aligned with the United Nation's Sustainable Development Goals, specifically Goal 7 on affordable and clean energy, Goal 9 on resilient infrastructure, Goal 11 on sustainable cities and communities, Goal 12 on responsible consumption and production, Goal 13 on climate action, and Goal 14 on protecting life below water.

8. **Value addition by AIIB.** AIIB's loan will fill the financing gap of the project and contribute to further development of partnerships with Asian Development Bank (ADB). AIIB's participation in the project would also provide assurance that the project will meet strict international standards covering emissions from WTE and other environmental requirements.

9. **Value addition to AIIB.** This will be the second loan to the Maldives, establishing an important new partnership for AIIB. The project will be a good opportunity to build AIIB's operational capacity in solid waste management in general and environmentally friendly WTE technology in particular.

10. **Lessons learnt from previous projects.** The project has incorporated lessons from the Vandhoo Island 40 tpd incineration facility located in the northern part of the country, the first and only solid waste incineration plant in the country. The facility is managed by WAMCO.<sup>4</sup> The project was completed in June 2016, and its operationalization has been delayed for a long time for the following reasons: (i) inadequate hand-over from suppliers; (ii) insufficient waste supply from the northern region requiring supplemental waste from other regions; and (iii) low capacity of WAMCO to take over operations. Key lessons include: (i) incorporate operation and maintenance (O&M) into works contracts; (ii) ensure careful planning and design with clear understanding of waste composition and volume; and (iii) include capacity building for O&M.<sup>5</sup> Lessons from project implementation experience from other ADB projects also highlight the need for high project readiness and technical assistance in procurement and contract management. One of the key features incorporating the above lessons for the proposed project is that a DBO contract for the WTE plant was designed to include a long-term operational phase so a capable private company can operate the plant while building capacity of concerned government agencies.

11. **Non-concessional Borrowing.** As an IDA-grant eligible country, the Maldives was subject to the World Bank's Non-Concessional Borrowing Policy (NCBP) until June 30, 2020.<sup>6</sup> The latest joint World Bank-IMF debt sustainability analysis (April 2020) concluded that Maldives' risk of external (and overall) debt distress remains high. As such, the country has a zero non-concessional borrowing ceiling. The Maldives can request waivers for non-concessional borrowing on a loan-by-loan basis. An ex-ante waiver was sought for the AIIB co-financing loan. In its letter dated February 9, 2020, GOM informed AIIB that the World Bank had granted a waiver for this loan when the case of Maldives was reviewed in the November 2019 NCBP Committee meeting. The decision and rationale by the NCBP Committee on the AIIB ex-ante waiver request

<sup>4</sup> Funded by the World Bank as part of the Maldives Environmental Management Project, 2008.

<sup>5</sup> There was also a failed attempt at a public-private partnership for a Zone 3 solid waste project in 2011. A contract was awarded but terminated due to political changes. The Government of the Maldives therefore requested public sector funding.

<sup>6</sup> The Sustainable Development Finance Policy replaces the Non-Concessional Borrowing Policy as of July 1, 2020. Maldives, as a country in high risk of external (and overall) debt distress, continues to have a zero non-concessional borrowing ceiling.



is summarized as follows: “the proposed USD40 million Asian Infrastructure Investment Bank (AIIB) loan is appropriately integrated with other financing sources and the proposed financing would be concessional. A waiver was deemed warranted.” The official letter communicating the decision to the GOM on the ex-ante waiver requests reviewed in the November 2019 NCBP Committee meeting is dated January 16, 2020.

12. **Project Relevance amid COVID-19.** The project remains highly relevant in times of COVID-19 crisis considering its importance in limiting spread of infectious diseases through the provision of sanitary treatment of solid waste, including medical waste. The project’s positive impact on the environment and ocean health will contribute to the recovery of tourism industry over the medium- to long-term, which has been severely affected by the pandemic.

## B. Project Objective and Expected Results

13. **Project Objective.** The main objective of the project is to establish a regional solid waste treatment system in the Greater Malé region.

14. **Expected Results.** The Results Framework will be used to monitor and evaluate the achievement of proposed Project Objective Indicators against 2020 baseline and annual targets covering the following results:

- (i) Treated solid waste with residuals safely disposed or recycled
- (ii) Reduction of annual GHG emissions; and
- (iii) Electricity generated from WTE (50% is renewable energy)

15. **Expected Beneficiaries.** Expected beneficiaries of the project are around 350,000 residents (2026) in the Greater Malé region as well as tourists to visit the region. Furthermore, there are likely to be significant global and regional environmental beneficiaries with decreases in waste entering oceans and reduced greenhouse gas release to the atmosphere.

## C. Description and Components

16. **Overview.** The proposed project is to be co-financed with ADB (lead co-financier) and the Japan Fund for the Joint Crediting Mechanism (ADB-administered trust fund). The project is the second phase of a bigger ADB-supported waste management program in the Maldives,<sup>7</sup> which aims to improve various aspects of solid waste management in the Greater Malé region, including collection, transfer, treatment using advanced Waste-to-Energy (WTE) technology, recycling, public awareness in reduce-reuse-recycle (3R), and strengthen institutional capacities for service delivery and environmental monitoring. The first phase financed by ADB (approved in June 2018) is already being implemented and focuses on improving waste collection and transfer and on bailing of municipal solid waste as an adequate interim solution to stop open dumping and burning

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<sup>7</sup> ADB (2018) *Reports and Recommendations of the President to the Board of Directors: Proposed Grant and Technical Assistance Grant and Administration of Grant Republic of Maldives - Greater Malé Environmental Improvement and Waste Management Project (Project Number: 51077-002)*.

on Thilafushi. These activities under the Phase 1 are scheduled to be completed by 2023, one year prior to the expected commissioning of the WTE plant.

17. The project has the following two components:

18. **Component 1: Establishment of disaster and climate resilient regional waste management facility.** This will include: (i) construction of a 500 tpd WTE plant with 15 years O&M contract, including two treatment lines of 250 tpd each, energy recovery of eight megawatt capacity (surplus electricity), and air pollution control system; and (ii) a landfill for safe disposal of air pollution control residues and non-marketable bottom ashes. The WTE plant will be implemented through a Design-Build-Operate (DBO) contract with a long-term O&M period to ensure sustainable operations. All facilities will adopt disaster- and climate-resilient features such as raised floor elevations, flood-proof mechanical and electrical equipment and landfill cells, and enhanced drainage systems.

19. **Component 2: Institutional capacity building in sustainable waste management, environmental monitoring, and public awareness.** This will include: (i) project management and construction supervision consultancy; (ii) capacity strengthening of MOE and Environmental Protection Agency (EPA) in project management, supervision, and environmental monitoring to sustainably manage and monitor the regional waste management facility; and (iii) targeted public awareness campaigns in the main population centers of Malé, Hulhumale, and Villimale to raise awareness of the new waste collection and waste management system, and 3R behaviors to support a clean environment.

#### D. Cost and Financing Plan

20. A project cost and financing plan is shown in Table 1. The project cost is inclusive of taxes and duties.

**Table 1: Project Cost and Financing Plan (in USD million)**

Item	Cost	Financing (%)			
		AiIB	ADB	JFJCM	GOM
Component 1: Establishment of climate resilient regional waste management facility	121.69	33.96	57.57	8.34	21.82
Component 2: Institutional capacity building and public awareness	6.11	-	5.60	0.16	0.35
<b>Sub-total</b>	<b>127.80</b>	<b>33.96</b>	<b>63.17</b>	<b>8.50</b>	<b>22.17</b>
Contingencies <sup>8</sup>	20.41	6.04	10.22	1.50	2.65
Financing charges	2.92	-	-	-	2.92
<b>Grand Total</b>	<b>151.13</b>	<b>40.00 (26.5%)</b>	<b>73.39 (48.6%)</b>	<b>10.00 (6.6%)</b>	<b>27.74 (18.3%)</b>

<sup>8</sup> Physical contingencies are computed at 10% for civil works and equipment. Price contingencies are computed at 1.5%-1.6% on foreign exchange costs and 1.0%-1.5% on local currency costs, which include provision for potential exchange rate fluctuation under the assumption of a purchasing power parity exchange rate.

21. **Co-financing arrangement.** The project will be jointly co-financed by the Bank, ADB, and ADB-administered JFJCM, providing an opportunity for mutual sharing of experience between development partners. The Bank will co-finance the component 1 (construction of the WTE plant) only. ADB is the lead co-financier and therefore, will provide procurement, safeguards, disbursements, project monitoring and reporting services for the Project on behalf of the Bank. As permitted by the Bank's policies, ADB's policies and procedures on environmental and social issues, procurement, disbursements, financial management, project monitoring, and reporting will be used for the Project (including activities to be financed by the Bank), as they are materially consistent with the Bank's corresponding policies in accordance with the Co-financing Framework Agreement. The Bank will provide adequate support to Project implementation according to a co-lender's agreement between the Bank and ADB. Islamic Development Bank (IsDB) plans to provide parallel financing for construction of a transfer station in Hulhulmalé and the dumpsite remediation and closure on Thilafushi Island (adjacent to the project site). ADB and AIIB are closely coordinating with IsDB.

22. **Climate finance.** AIIB adheres to the joint MDB climate finance tracking methods in tracking climate finance in its projects. As this is a waste-to-energy project, USD40 million or 100% of AIIB's financing for the project can be considered as mitigation finance, under category 6.2 Solid waste management.

23. Based on the principle of conservativeness, the additional cost of adaptation measures in Component 1 (1.98 million, about 5%) can also be considered as adaptation finance as the following criteria have been met in the project document:

- setting out the climate change vulnerability context of the project;
- making an explicit statement of intent of the project to reduce climate change vulnerability; and
- articulating a clear and direct link between specific project activities and the project's objective to reduce vulnerability to climate change.

## E. Implementation Arrangements

24. **Implementation period.** The Project is expected to be implemented from October 2020 to September 2026.

25. **Implementation Management.** The Ministry of Finance (MOF) will be the executing agency and the Ministry of Environment (MOE) will be the implementing entity. The MOE has established a Project Management Unit (PMU) in its Waste Management and Pollution Control Department comprising eight officials from the MOE and WAMCO. The PMU structure is as follows: (i) Project Director (part-time, Director General of Department); (ii) Project Manager; (iii) Procurement Specialist; (iv) Finance Specialist; (v) Safeguard Specialist; (vi) Civil Engineer; (vii) IEC Specialist; and (viii) administrative assistant. The PMU will recruit: (i) consulting firms to support project management, engineering, construction supervision, capacity building, and

community awareness; and (ii) individual experts to support environment and disaster risk management activities. The project steering committee<sup>9</sup> will provide overall policy and strategic guidance to the project. A project technical committee<sup>10</sup> will coordinate design and implementation issues.

26. **Monitoring and Evaluation (M&E).** The PMU will establish a project performance management system (PPMS) using targets, indicators, assumptions, and risks in the project Results Framework (RF). An expanded RF will be developed to serve as monitoring and evaluation framework considering important monitoring parameters in addition to those included in RF. The PPMS will include gender-disaggregation, with specific focus on the vulnerable and female. The baseline data of RF indicators and targets and monitoring evaluation framework could be generated through data from government's consultant feasibility study and further collection by the project management consultant. Such baseline data, disaggregated by income level and gender, should be established within 12 months of project effectiveness. After the baseline is established, the PMU will prepare quarterly, mid-term and end of project monitoring reports using the same indicators and submit report to ADB and AIIB.

27. **AIIB's Implementation Support.** The AIIB project team, including environmental and social safeguard specialists, will join ADB's implementation support missions whenever possible.

28. **Procurement.** ADB is the lead co-financier for this project. Procurement of goods, works, and services for the project will be carried out in accordance with ADB Procurement Policy: Goods, Works, Non-consulting and Consulting Services (2017 as amended from time to time); and the Procurement Regulations for ADB Borrower: Goods, Works, Non-consulting and Consulting Services (2017, as amended from time to time). The rights and obligations between the AIIB and ADB will be governed by the co-lender's agreement. The project will also be subject to ADB Anti-Corruption Guidelines dated June 2018. The ADB procurement policy, procurement regulations and Anti-Corruption Guidelines are materially consistent with the AIIB's procurement policy and associated Procurement Instructions to Recipient and Prohibited Practices and therefore, seen fit for purpose. A universal procurement will apply to all procurement packages to be financed by AIIB and ADB.

29. **Financial Management.** The PMU established within the Ministry of Environment (MOE) will be charged with the financial management responsibility of the project. The PMU has considerable experience in implementing MDB financed projects including the ongoing ADB-supported projects. The PMU is currently staffed with one Project Accountant, however, with the additional workload from projects with overlapping implementation period, an additional Accountant or Accounts Officer will be engaged to support the PMU. The existing financial management policies and procedures, consistent with international accounting principles and

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<sup>9</sup> The Steering Committee comprises representatives from Ministry of Finance, Ministry of National Planning, Housing, and Infrastructure, WAMCO, Ministry of Tourism, Ministry of Health, Ministry of Gender, Family and Social Services, Local Government Authority, Environmental Protection Agency, STELCO, and Malé City Council.

<sup>10</sup> The Technical Committee comprises representatives of MOE, Ministry of Tourism, Ministry of Health, Local Government Authority, Ministry of National Planning, Housing, and Infrastructure, Malé City Council, Environmental Protection Agency, WAMCO, STELCO, Greater Malé Industrial Zone Limited, two representatives from environmental non-government organizations.

practices will apply to the project. As the PMU only has a manual accounting system in place, the PMU will procure an accounting software to improve the efficiency and effectiveness of the accounting and reporting process. The PMU will provide annual audit reports within six months of the fiscal year.

### 3. Project Assessment

#### A. Technical

30. **Project Design.** The Feasibility Study confirmed that construction of a centralized waste incineration plant with energy recovery would be the best preferred treatment option. The project design is robust and adequately addresses the key waste management issues facing the project area, including measures to address the risks of sea-level rise from climate change as well as natural disasters such as tsunamis and extreme climate events. There is a consensus among the key government stakeholders and co-financing partners that the proposed WTE plant should be constructed through a DBO approach, incorporating operations and maintenance into works contracts. Some of the advantages of DBO include: (i) single point of accountability throughout design, build, and operate phases; (ii) lower “whole-life” costs; (iii) greater incentives for innovation, durability and reliability; and (iv) lower risk of long-term non-performance of the facility. The DBO contract will include three and a half years of “D&B” phases followed by 15 years of an “O” phase. The project will finance the “D&B” phases and the Government will finance the “O” phase. Bidding process is currently underway. Project design including cost estimates and implementation schedule accommodates possible delays or cost increases due to COVID-19 impact on supply chains.

31. Until commissioning of the WTE plant, the daily generated waste will be separated into two fractions: (i) Construction and Demolition Waste (CDW); and (ii) Municipal Solid Waste (MSW). MSW and flammables from CDW will be baled and stored in a bale stock. It is envisaged that the bale stock will comprise of approx. 300,000 tons of waste when the WTE is commissioned. Bales will constantly be supplied to the WTE plant to accommodate variations in the incoming waste volume.

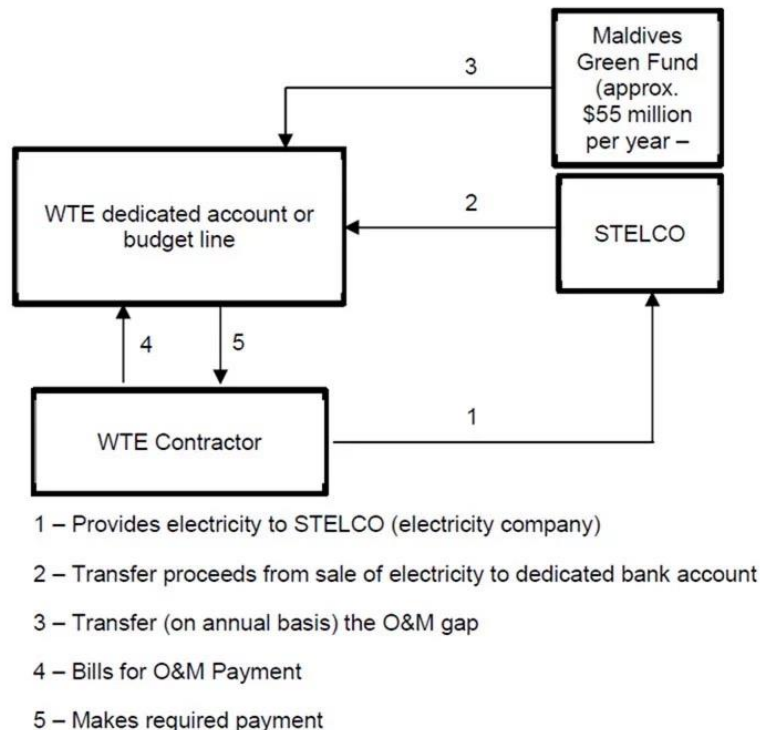
32. **Operational sustainability.** Solid waste treatment and disposal services established under the project will be maintained through a long-term O&M phase (15 years) under the DBO contract with a specialized WTE operator, who will also design and build the facilities. The contract has various measurable operational performance guarantees, including service quality, efficiency and environmental standards, and damages as effective leverage mechanisms for compliance. MOE and EPA will monitor O&M performance, and the project will strengthen their capacity to do so. MOE will take over the WTE plant after the 15 years O&M period.

33. After completion of the design and build period, MOE will be responsible to pay to the operator the full O&M cost of the WTE plant for the duration of the operational period, which is 15 years. Total O&M costs for the plant are estimated at \$10-11 million per year. The WTE plant will have four different sources of revenue, namely: (i) sale of electricity; (ii) sale of metals; (iii) sale of incineration bottom ash; and (iv) tipping fee of resort waste delivered at Thilafushi. State Electric

Company Limited (STELCO), the state electricity company, plans to purchase electricity, and the construction and recycling industries are potential markets for metals and bottom ash.

34. The WTE plant will generate 8MW of surplus electricity, upon commissioning expected by the end of 2024. The current demand on Thilafushi is around 2MW. However, total power demand on the island is more than 4MW as most of the industries on the island have private diesel generators. Grid demand on Thilafushi is expected to grow considerably with expansion of the power grid and planned developments on the island. In addition, overhead connection to the nearest Gulhifalhu Island (distance 300 meters), where an international commercial harbor is under development, is planned to fully utilize energy from the WTE plant as the base case scenario.

35. The Government will confirm through a tripartite memorandum of understanding between MOF, MOE and STELCO that it will ensure that all the surplus electricity from the WTE plant will be purchased at a minimum price of USD100 per MWh. By December 31, 2023 (one year prior to the expected commissioning of the WTE plant), the Government will approve an updated plan for the financing of O&M, including: (i) confirmation of the sale price of electricity produced from the WTE plant; (ii) identification of the financing sources to meet any funding gap; and (iii) the fund flow arrangement for paying the DBO operator on time to ensure service continuity. MOE will be responsible to formalize a power purchase agreement with STELCO and request annual allocation to cover O&M shortfall from the Maldives Green Fund or MOF for other budget allocations. MOE will receive proceeds from sales of by-products from the WTE plant such as electricity, and other government transfers, as required, and accrue them in a separate account or budget line in MOE for exclusive payment for operations of the WTE plant. A suggested fund flow is shown below.



## B. Economic and Financial Analysis

36. **Economic Analysis.** As a lead co-financier, ADB has undertaken economic and financial analysis of the proposed project. The economic analysis assessed the economic viability of project in terms of economic internal rate of return (EIRR) and economic net present value (ENPV). A Cost-Benefit Analysis (CBA) was carried out to assess the economic viability of the project comparing “with” and “without-project” scenarios. The considered costs include economic cost of initial construction costs and economic O&M costs. The expected project benefits include: (i) benefits from reduction in health expenditure to the residents in the project area; (ii) avoided land reclamation cost; and (iii) resale value of the by-products of the processed waste including power, bottom ash and metals generated from the WTE plant.

37. The EIRR was estimated at 17.8 percent and ENPV at USD90.4 million based on a 9 percent discount rate. Sensitivity analysis has been carried out with respect to a 20 percent increase in construction cost, a 20 percent increase in O&M cost, a 20 percent decrease in benefits, a delay in operations by 1 year and a worst-case scenario combining all of these scenarios. The EIRR remains above the economic opportunity cost of capital (EOCC) of 9 percent for all the scenarios, including the combined worst-case scenario under which the EIRR stands at 10.2%. If it is assumed that the power sale would be restricted to 2MW, EIRR would still be 10.8%. The economic viability of the project will increase further if unquantifiable benefits such as environmental improvements are included in the analysis. The approach and detailed results are presented in Annex 3.

38. **Financial Analysis.** A comprehensive financial analysis has been carried out and a financial projection model has been developed to assess the financial sustainability of the project over the life of the project. The project will primarily generate revenues from sale of power generated from the WTE plant. Revenue from sale of by-products such as metals and bottom ash sellable to construction and recycling industries and revenues from tipping fee/disposal fee (resort waste only) would provide additional revenue stream. State Electric Company Limited (STELCO), the state company for electricity plans to purchase the electricity at feed in tariff rate of USD100 per MWh - this is based on minimum assurance provided by MOF, MOE, and STELCO through a tripartite memorandum of understanding. Market based rates has been assumed for the two by-products and the existing tipping fee has been considered. The estimated annual revenues would cover substantial part of the annual O&M requirements under the DBO contract (96% per annum on average). In the worst-case scenario (grid demand of 2MW), the O&M cost recovery will decrease to 43% (average O&M gap is USD5.8 million) per annum on average. Potential budget shortfalls to pay any O&M gap pose a substantial financial sustainability risk. To address this risk, the government will cover any O&M shortfall either from the Maldives Green Fund (Green Tax levied on tourists) or other budgetary allocations. In the medium to long term, MOE is also committed to moving towards a full O&M cost recovery and polluter’s pay approach, and accordingly is planning to collect a tipping (treatment) fee for the waste delivered to the WTE facility, which is currently not in place (except for resorts delivering waste to Thilafushi). More details are presented in Annex 3.

### C. Fiduciary and Governance

39. **Procurement.** MOE is responsible for implementing the project. AIIB will finance Component 1 only. Under Component 1, there is only one DBO contract i.e. Construction of a WTE plant with operation period of 15 years. The PMU with an assistance from ADB project preparation consultant has already completed pre-qualification, and tendering is underway following single stage two-envelop system. The PMU has prepared the Project Administration Manual (PAM) with assistance from ADB. The PAM defines roles and responsibilities of different stakeholders and provides guidance on procurement arrangements. ADB has shared PAM with AIIB and comments were provided for incorporation. The PMU has also prepared procurement plan for the first 18 months and ADB has provided clearance upon concurrence from AIIB.

40. **Financial Management.** A Financial Management assessment was conducted which concluded that the proposed financial management arrangements are deemed adequate, to provide timely and reliable information on the use of funds and safeguarding assets. The main risks identified are: (i) the current staff complement of the PMU is inadequate to handle multiple projects simultaneously; (ii) the project has a complex financing structure to be accounted and reported on using a manual system; (iii) absence of an effective internal audit function; and (iv) insufficient interim financial analysis and reporting. These risks will be mitigated by: (i) appointing an additional Accounts staff to PMU, who will be trained in ADB's FM requirements, disbursement procedures and systems; (ii) A comprehensive financial information template agreed on with ADB and AIIB will be used for preparing quarterly project progress reports; (iv) strengthening of MOE's internal audit function; and (v) procurement of an accounting software for the PMU use.

41. The project budget included in that of MOE will be intertwined in the Government's overall budget review and approval process. Project transactions will be accounted and reported on following International Public Sector Accounting Standard for cash-based accounting and the government's accounting laws and regulations. Project transactions will be accounted, maintained and reported on by funding source and project activities. The Internal Audit function of the MOE will include project activities within their audit scope over the project implementation period. The status of the internal audit recommendations related to the project (if any) will be regularly monitored by MOE through its PMU and included in the quarterly progress reports. The PMU will provide quarterly consolidated project unaudited financial statements within 45 days of the quarter end. Annual audit reports will be prepared by the Maldives Auditor General's Office. The audit report comprising of the audited project financial statements and management letter will be due within six months of the fiscal year end.

42. **Disbursements.** The ADB, JFJCM and AIIB Financing proceeds will be disbursed in accordance with the ADB's Loan Disbursement Handbook (2017, as amended from time to time), and detailed arrangements agreed upon between the government, ADB and AIIB. For the AIIB loan, the borrower shall submit one original of the Withdrawal Application (WA) and copies of supporting documents to ADB using the direct payment procedure only. ADB will review each WA and advise AIIB to make the necessary payment, if any, subject to approval by AIIB. AIIB's approval shall be made in accordance with the AIIB's Loan Agreement and other applicable guidelines and procedures. AIIB will promptly inform ADB once payment has been made. In case



AIIB rejects the payment requested in the WA, it shall promptly inform ADB and the Borrower in writing of its decision and the basis for such decision.

43. The PMU will be responsible for: (i) preparing annual contract awards and disbursement projections; (ii) requesting budgetary allocations for counterpart funds; (iii) collecting supporting documents; and (iv) preparing and sending withdrawal applications to ADB through MOF.

44. **Governance.** AIIB is committed to preventing fraud and corruption in the projects it finances. For this project, ADB's Anticorruption Policy (1998, as amended to date) shall apply which is materially consistent with AIIB's Policy on Prohibited Practices (2016). However, the Bank reserves the right to investigate, directly or indirectly through its agents, any alleged corrupt, fraudulent, collusive, coercive or obstructive practices, and misuse of resources and theft or coercive practices relating to the program and to take necessary measures to prevent and redress any issues in a timely manner, as appropriate.

45. **Institutional Capacity.** Key entities involved in the project (PMU, WAMCO and EPA) have as of now limited staffing and technical and managerial experience. The project will strengthen their capacity through technical assistance and training.

#### **D. Environmental and Social**

46. **Environmental and Social Policy (including Standards) and Categorization.** The project will be co-financed with the ADB as lead co-financier, and its environmental and social (ES) risks and impacts have been assessed in accordance with the ADB's Safeguard Policy Statement (SPS), 2009. To ensure a harmonized approach to addressing ES risks and impacts of the Project, and as permitted under AIIB's Environmental and Social Policy (ESP), ADB's SPS will apply to the project in lieu of AIIB's ESP. AIIB has reviewed the ADB SPS and is satisfied that: (a) it is consistent with AIIB's Articles of Agreement and materially consistent with the provisions of AIIB's ESP and the relevant ES Standards; and (b) the monitoring procedures that are in place are appropriate for the project.

47. Under ADB's Safeguard Policy, the Project has been categorized as Category A for environment, considering the scale and significance of the environmental impacts and risks, Category C for involuntary resettlement and Indigenous Peoples (which is equivalent to Category A if AIIB's ESP were applicable). There will be no land acquisition, physical or economic displacement due to the WTE Plant. ADB has conducted relevant due diligence and confirmed that no Indigenous Peoples, as defined by ADB's SPS, were found within the project area. A Land Acquisition and Resettlement Due Diligence Report has been prepared. An Environmental Impact Assessment (EIA) accompanied by an Environmental Management Plan (EMP) has been prepared for the WTE to meet requirements in ADB's SPS.

48. **Environmental Aspects.** This project will improve the environmental quality in the Greater Malé region in terms of bulk reduction of solid waste on a regular basis, energy recovery and stop of open dumping and burning of solid waste in Thilafushi. Thilafushi Island has been developed as a solid waste landfill since December 1992 and has become an industrial island.

This Project will be located on the land reclaimed from the lagoon, which has been conducted by the government. An environmental audit has been carried out for the reclaimed project in accordance with ADB's SPS. The audit concludes that the reclamation is compliant with relevant regulations in the Maldives and environmental performance has been satisfactory.

49. This Project will not directly affect the three Marine Protected Areas (MPA) for reef conservation within 5km radius from the project site, including the Lion Head diving site, which is closest to the Project site. A critical habitat assessment was conducted as part of the EIA. The results show that critical habitat for at least one terrestrial insect (identified as *Enallagma Maldivensis* that thrives in freshwater environment) is likely located in the area of analysis, but unlikely on Thilafushi where there is no freshwater body. As a precautionary measure, the critical habitat assessment recommends continuous monitoring around Thilafushi Island to confirm the extent of biodiversity in various seasons of the year.

50. The Project will generate adverse environmental impacts mostly in the operational phase. The negative environmental impacts during the construction phase will include air and water pollution, noise from construction sites and labor camps, and generation of construction waste. During the operation of this Project, the significant negative environmental impacts will be caused by: (a) air emissions from the stacks of the WTE plant; (b) effluent of cooling water, brine (from desalination) and treated leachate and wastewater; (c) fly and bottom ashes; (d) odor at the plant; and (e) noise. Most of the adverse impacts during the operational phase will be addressed in the design by the DBO contractor, where a high standard, such as EU standards for emissions, discharge of outfalls and landfill will be applied. Such requirements and standards have been embedded as performance guarantees in the tender document for the DBO contractor and will be included in the contract. Thus, significant impacts can be reduced, and residual impacts can be mitigated by measures specified in the EMP. The EMP delineates the mitigation measures for construction and operational phases and proposes an environmental monitoring plan. The EMP also presents the institutional arrangement and the budget for the implementation of the EMP.

51. This Project is the second phase of an ADB-supported waste management program in the Maldives, and it is linked to: (i) the activities of the first phase of the project focusing on waste collection and transfer; and (ii) the closure and remediation of the existing dumpsite in Thilafushi to be funded by the Islamic Development Bank. The environmental and social risks and impacts of these linked activities will be reviewed. The transition plan for waste management between the closure of the dumpsite and the commissioning of the WTE plant will also be reviewed during implementation.

52. **Climate Change Risks and Opportunities.** Considering the low-lying elevation of the Maldives (1.5 meters above sea level), the country is exposed to risk of sea level rise and climate change has exacerbated the risks of ocean-based disasters (tsunamis, storm surges, ocean swells, strong winds). Thilafushi Island is in a moderate cyclonic hazard zone and severe tsunami risk zone. Climate-resilience design will be adopted in this Project considering the impact of climate change, by incorporating suitable adaptation and mitigation measures. Mitigation measures include utilizing the electricity generated from the WTE plant for 100% plant operations, while adaptive measures include strengthened seawalls, elevating infrastructure and electrical-

mechanical components and installing necessary drainage systems considering future rainfall and sea level rise. In addition, emergency planning and awareness raising in local communities to reduce associated environmental and public health risks from disasters are included in the project design. Costs associated with mitigating and adapting to climate change has been incorporated into the Project budget.

53. The operation of the WTE Plant will be a potential source of greenhouse gas (GHG) emissions. However, the production of greenhouse gases due to landfilling will be reduced as the existing open dumpsite in Thilafushi will be closed before the WTE plan is commissioned. In addition, the WTE plant will generate electricity for the industries on Thilafushi or nearby islands, replacing their dependence on fossil fuel use, where most of the electricity is generated by diesel. Thus, an overall reduction of GHG emissions of this Project is estimated as 808,345 tons carbon dioxide equivalent over its 20 years of operation (about 40,000 tons per year)<sup>11</sup>.

54. **Social Aspects.** A Land Acquisition and Resettlement Due Diligence Report (LARRD) has been prepared in accordance with the ADB's requirements. The Project will not require land acquisition as the WTE plant is to be located on government land reclaimed on Thilafushi Island. No permanent or temporary physical or economic impacts resulting from Project activities are expected as all activities will be within the available government land, and there are no Indigenous Peoples communities present at or around the project sites.

55. A socio-economic baseline assessment was conducted to inform living conditions of the workers residing in Thilafushi and Gulhifalhu and commensurate measures have been adopted in the EMP with respect to possible disturbance arising from traffic volume of vehicles both during construction and operation. In general, the Project will contribute to better waste management and generate significant socio-economic benefits in the Greater Malé region and reduce the health risks from exposure to air pollution not only to workers residing in the Project area but also to residents, workers and tourists on the islands at the downwind direction.

56. The project is classified as having "some gender elements" as per Guidelines for Gender Mainstreaming Categories of ADB Projects.<sup>12</sup> Project design includes numeric targets for training of eligible women staff in monitoring sustainable WTE operations and public awareness generation on WTE and 3R<sup>13</sup>. In addition, project design will ensure provision of male, female and all-gender and barrier free toilets at the WTE plant and other project facilities.

57. **Occupational Health and Safety, Labor and Employment Conditions.** The EIA identifies occupational health and safety (OHS) measures during both construction and operation phases. OHS and labor requirements have been embedded as performance guarantees in the

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<sup>11</sup> Averted emission during the period (diesel plus open dumping) – Project emission during period (WTE) = GHG emissions reduction. Assuming 160,000 tons of waste per year is incinerated, net energy output is 79,000 MWh/year, and there is a 0.72 tCO<sub>2</sub>e/MWh emission factor. The resulting number is 808,345 of tCO<sub>2</sub>e averted over 20 years.

<sup>12</sup> <https://www.adb.org/sites/default/files/institutional-document/33623/files/guidelines-gender-mainstreaming-categories-adb-projects.pdf>

<sup>13</sup> At least 70% eligible women staff, reported improved skills in monitoring sustainable WTE operations and at least 2,000 people in Greater Malé region (of whom at least 70% are women), reported improved awareness on WTE and 3R.

tender document for DBO contractor and will be included in the contract. The PMU will ensure bidding documents include clauses on those requirements. The PMU has also prepared its procedures for addressing OHS issues responding to COVID-19.

58. **Stakeholder Engagement, Consultation, and Information Disclosure.** Numerous stakeholder consultations were conducted during the project preparatory stage from 2017 up to 2019 and will be continued throughout project implementation. Documentation of all stakeholder consultations is included in the EIA, which includes discussions on project perception, the selected locations, environmental and social impacts when implementing the project, energy use and efficiency, harbor, and road use, among others.

59. The EIA was disclosed on the ADB website<sup>14</sup> in December 2019 and updated in March 2020, and the LARRD report disclosed in February 2020. The ES documentation has been disclosed by MOE on its website<sup>15</sup> and made available in hard copy in the Project area. The executive summary of the EIA has been translated into Dhivehi language and disclosed on the same website. The ES documentation has also been disclosed on the AIIB website<sup>16</sup>.

60. **Project Grievance Redress Mechanism (GRM).** A three-tier GRM has been established for the Project and the PMU shall notify the public that the same will be used for the project. Communities and individuals who believe that they are adversely affected by the Project may submit complaints to existing project-level grievance redress mechanisms.

61. **Independent Accountability Mechanism (IAM).** As noted above, ADB's SPS will apply to this project instead of AIIB's ESP. Pursuant to AIIB's agreement with ADB, AIIB will rely on ADB's independent accountability mechanism, the Accountability Mechanism, to handle complaints relating to environmental and social issues that may arise under the Project. Consequently, in accordance with AIIB's Policy on the Project-affected People's Mechanism (PPM), submissions to the PPM under the Project will not be eligible for consideration by the PPM. For information on ADB's Accountability Mechanism, please visit: <https://www.adb.org/site/accountability-mechanism/main>.

## **E. Risks and Mitigation Measures**

62. The Bank assigns a High overall risk rating to the proposed Project, as summarized in

63.

64. Table 2. The Bank will monitor the implementation and effectiveness of the mitigation measures during Project implementation through the progress reports from the PMU, as well as supervision missions.

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<sup>14</sup> <https://www.adb.org/projects/51077-003/main>

<sup>15</sup> <http://files.epa.gov.mv/file/1495>

<sup>16</sup> <https://www.aiib.org/en/projects/details/2019/proposed/Maldives-Greater-Male-Waste-to-Energy-Project.html>

**Table 2: Summary of Risks and Mitigating Measures**

<b>Risk Description</b>	<b>Assessment Ratings (High, Medium, Low)</b>	<b>Mitigation Measures</b>
<b>Technical</b> Weak technical capacity of implementing entity to manage and supervise the project.	High	ADB-supported Phase 1 included technical design and supervision consultants to support the implementing entity (MOE), and the proposed project will continue to finance technical assistance.
<b>Technical</b> Chosen technology not affordable, proven, or feasible.	Medium	Technology selection to be based on findings of waste audit, recycling strategy, investment cost, O&M cost, institutional capacity, and best practices. Lessons from the past donor experience in similar projects have been incorporated.
<b>Technical</b> Poor O&M performance of the WTE contractor results in poor or disruption of services and/or higher cost.	Medium	The DBO contract has measurable O&M performance guarantees and damages as leverage mechanisms for contractor performance. Capacity building support through project management, design and supervision and technical assistance consultants will strengthen MOE and EPA capacity to monitor O&M performance and manage DBO contract effectively.
<b>Economic and Financial</b> Budget shortfalls or slow allocation delay payments to DBO contractor during O&M period causing interruption of solid waste management service.	High	A tripartite memorandum of understanding will be signed by MOF, MOE, and State Electric Company Limited to ensure all surplus electricity is evacuated and sold to the grid. MOF and MOE agreed to fund flow arrangements, sources, and allocations (financing plan) for O&M payment, which will be finalized before start of O&M period. Continuous policy dialogue with the government will be conducted for regular revision of tariff or green tax to fully cover O&M cost.
<b>Economic and Financial</b>	High	In the adjacent Gulhifalhu island the projected electricity demand by 2024 is

Surplus electricity from WTE not fully utilized and unsold, lowering economic, financial, and environmental benefits.		around 16-20MW (according to Energy Department of the Ministry of Environment). Also, it is projected that the energy demand in Thilafushi itself (island where WTE plant is located) will considerably increase.
<b>Procurement</b> Weak capacity of the MOE in procurement and project management leading to delays.	Medium	The MOE has in-house project implementation experience gained from earlier and ongoing World Bank funded solid waste management projects, as well as experience implementing ADB energy projects. <sup>17</sup> The PMU will receive consultant support in project management and additional support in ADB requirements (procurement, safeguards, etc.) from the TA to ensure smooth implementation.
<b>Procurement</b> Extreme weather conditions and price surges of materials beyond projections and contingencies result in cost overruns and delays in project completion.	Medium	The longer implementation period will accommodate project delays, including those caused by heavy monsoon. The project costs incorporate sufficient contingencies to cover cost overruns.
<b>Procurement</b> Remoteness of the country and a relatively small-scale WTE might fail to attract qualified bidders for the DBO contract.	Medium	The project has already attracted enough potential bidders at a pre-qualification stage.
<b>Environment and Social</b> Appropriate technology to manage environmental risks and impacts of the WTE plant.	High	Technology that can meet international standards will be adopted by the DBO contractor. Performance guarantees have been embedded in the tender document of the DBO contractor and will be included in the contract.
<b>Environment and Social</b> Weak institutional capacity of the PMU to	Medium	Additional TA will support environmental monitoring and institutional strengthening of the PMU.

<sup>17</sup> ADB (2014) *Report and Recommendation of the President to the Board of Directors: Proposed Grant and Administration of Grant to the Republic of Maldives for Preparing Outer Islands for Sustainable Energy Development Project.*

supervise and monitor the implementation of the EMP.		
<b>Climate change</b> High climate and disaster risk due to sea level rise, ocean swells, storm surges, tsunamis, and strong winds.	High	Project preparation incorporated climate and disaster resilience into project design of structural and nonstructural components, which have been translated into tender documents.
<b>Financial Management</b> (i) Inadequate staff in the PMU accounts section to handle multiple projects simultaneously, and lack of training in ADB procedures and systems, (ii) Complex financing structure with several financiers, (iii) Absence of an effective internal audit function, (iv) Insufficient interim financial analysis and reporting, and (v) Project transactions are not recorded in a proper accounting software.	Medium	(i) Appointing additional Financial Staff to the PMU or Accounts Officer to support the PMU. (ii) Providing training in ADB's FM requirements, disbursement procedures and systems. (iii) Including comprehensive financial information in the quarterly project progress reports. (iv) Strengthening of MOE's internal audit function. (v) Procuring an accounting software for the PMU use.
<b>Overall</b>	High	

### Annex 1: Results Monitoring Framework

<b>Project Objective:</b>		To establish regional solid waste treatment system in the Greater Malé region.									
<b>Indicator Name</b>	<b>Unit of measure</b>	<b>Base line 2020</b>	<b>Cumulative Target Values</b>						<b>End Target</b>	<b>Frequency</b>	<b>Responsibility</b>
			<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>			
<b>Project Objective Indicators:</b>											
1. Solid waste treated with residuals safely disposed or recycled.	%	0	0	0	0	0	50	70	80	Annually	MOE/WAMCO
2. Reduction in estimated annual GHG emissions.	tons	0	0	0	0	0	20,000	20,000	20,000	Annually	MOE/EPA
3. Installed capacity of WTE plant (50% is renewable energy).	MW	0	0	0	0	0	8 (4)	8 (4)	8 (4)	Annually	MOE
<b>Intermediate Results Indicators:</b>											
4. Electricity generated from WTE (50% is renewable energy)	MWh	0	0	0	0	0	16,000 (8,000)	32,000 (16,000)	32,000 (16,000)	Annually	MOE
5. 500 tpd WTE plant (with extended O&M contract) is constructed and operational.	Text	-	-	-	-	Constructed	Operational	Operational	Operational	Quarterly	MOE/PMU
6. Landfill for safe disposal of WTE air pollution control residues and nonmarketable bottom ashes is constructed and operational.	Text	-	-	-	-	Constructed	Operational	Operational	Operational	Quarterly	MOE/PMU
7. Adoption of disaster and climate resilience measures in the design and construction phases of WTE.	Text	-	Adopted	Adopted	Adopted	Adopted	-	-	Adopted	Quarterly	MOE/PMU



## Annex 2: Detailed Project Description

1. The project will establish a sustainable regional solid waste treatment system in the Greater Malé region by: (i) developing treatment (proven waste-to-energy technology), recycling and disposal infrastructure; (ii) strengthening institutional capacities for sustainable solid waste services delivery and environmental monitoring; and (iii) improving public awareness on WTE and reduce-reuse-recycle (3R). The project aims to reduce disaster risk and improve climate change resilience while creating a cleaner environment and reducing greenhouse gas emissions.

### Project Components

2. The project will have the following two components.

3. **Component 1 – Establishment of disaster and climate resilient regional waste management facility.** This will include: (i) construction of a 500 tpd WTE plant with 15 years O&M contract on Thilafushi Island, including two treatment lines of 250 tpd each, energy recovery of eight megawatt capacity (surplus electricity), and air pollution control system; and (ii) a landfill for safe disposal of air pollution control residues (EU Landfill Directive 1999/31/EC for hazardous waste) and non-marketable bottom ashes. The facility will be able to accommodate a third 250 tpd treatment line, required to respond to further demand increase. The WTE technology minimizes land requirements and produces renewable energy addressing the critical land and electricity constraints in the Maldives. Recycling of marketable incineration bottom ash and metals will be promoted to further reduce landfill requirements and provide valuable materials for the construction industry. The WTE will be implemented through a DBO contract with a long-term O&M period to ensure sustainable operations. All facilities will adopt disaster- and climate-resilient features such as raised floor elevations, flood-proof mechanical and electrical equipment and landfill cells, and enhanced drainage systems (see below for more details).

4. **Component 2 – Institutional capacity building in sustainable waste management, environmental monitoring and public awareness.** This will include: (i) preparing and implementing a capacity development plan to improve the capacity of MOE and EPA to monitor and ensure sustainable WTE service delivery; (ii) strengthening MOE and EPA staff capacity in monitoring WTE operational performance and environmental standards, and managing performance-based DBO contract; (iii) support to enhance financial sustainability for WTE O&M, through implementation of an agreed O&M financing plan, including financial need forecasting and finalization of financing sources, revenue enhancement plan, responsibilities, and fund flow arrangements for payment of O&M; and (iv) targeted public awareness campaigns in the main population centers of Malé, Hulhulmale, and Villimale to raise awareness of the new waste collection and waste management system, and 3R behaviors to support a clean environment. The project will support PMU and government capacity to prepare, monitor, and manage sustainable WTE through consulting services for contract management, monitoring, supervision, and institutional development.

### Disaster and Climate Risks Reduction Measures

5. The Maldives is physically vulnerable to climate and disaster risk given its low elevation of 1.5 meters above sea level. Natural hazards such as extreme weather events may trigger flooding, coastal inundation or structural damage which poses risks to the WTE infrastructure and service continuity. These are expected to exacerbate because of climate change. Sea level rise may also affect the service provided by the project. Therefore, disaster- and climate-resilient designs are necessary to protect systems from natural hazards and climate change and are incorporated in the project. The table below shows the risks and mitigation measures associated with the WTE plant.

No.	Need for Disaster and Climate Risk Reduction	Risk Reduction Measures
1	Building envelope and its support structure strengthened towards Category 2 cyclone and to withstand intensity V MMI earthquake scale.	Elevated structures of the machinery hall (> 30m) and the stack (45 m) need to be reinforced and their foundations to be strengthened to meet the tensile stress due to elevated wind speeds and to reduce vulnerabilities of the buildings due to earthquake impact.
2	Protect civil structure against buoyancy.	Foundations of waste bunker to be strengthened or weight of bunker to be increased to reduce effects of buoyancy that would be due to increased sea water (i.e. ground water) level if bunker floor and the lower part of it were built as waterproof subsurface elements.
3	Raising 6 ha of land to the required elevation and shape the inclination.	The plot of land has a current height of 1.7m, to be elevated by 0.5 m and a higher inclination of the plot to be established.
4	Protecting critical equipment and enhance power availability.	Electrical equipment (transformer, emergency genset module) to be either installed waterproof or at an elevated level to keep it operational any time. Provide higher insulation classes for electrical equipment due to potential storm surges or protect equipment against water intrusion. Establish redundant power supply for critical equipment such as cooling water pumps, boiler feed-water pumps, etc. in the event of a power failure that may be due to water intrusion.
5	Watertight housing of cooling water pumps.	Protect cooling water pumps against water intrusion by waterproof installation (to reduce cavitation of cooling water pumps, they must be installed at or below ground level and, hence, are prone to potential water intrusion).

6	Enhanced drainage system capacity.	Larger pipes and retention ducts and ponds.
7	Stormwater throughout pumps and backflow inverters.	Up to 4 large stormwater pumps to be installed in watertight pump stations, to prevent sea water from intruding and to reduce the water pressure in the outfalls, back-flow inverters need to be installed.
8	Stabilization of landfill berms.	Because of intense rainfall, a higher erosion is expected so that stabilization measures for landfill berms to ensure their structural soundness become necessary.
9	Need for barrier to wind and mitigation against heat waves.	Plant vegetation (saline resistant plant) surrounding the buildings.

## Annex 3: Economic and Financial Analysis

### A. Economic Analysis

1. **Methodology and approach.** A cost-benefit analysis was carried out to assess the economic viability of the Project comparing “with-” and “without-project” scenarios. The Economic Internal Rate of Return (EIRR) and Economic Net Present Value (ENPV) of the Project was estimated based on a discounted cashflow analysis considering costs and benefits. Sensitivity Analysis was performed taking into consideration: (i) increased construction costs; (ii) increased O&M costs; (iii) decreased benefits; (iv) delay in operation by one year; (v) a worst-case scenario which combines the four previous scenarios; and (vi) power sale of 2MW only.

2. **Demand analysis.** The feasibility study identified the most appropriate waste management option using the screening and selection process known as the best practicable environmental option and site-specific conditions which provides maximum environment, economic and social benefit. Alternative designs were assessed in the feasibility study to determine the least cost option to achieve the project’s objective which included among others, selection of technology for composting, landfill and WTE. Increasing generation of waste, current unsustainable disposal practices (open dumping and uncontrolled burning of waste) and scarcity of land for solid waste management under ‘without project’ scenario justify the adoption of WTE (incineration) treatment under ‘with project’ scenario.

### 3. Key assumptions.

- (i) all costs are used in 2019 constant prices and converted at \$1 = Rf15.4;
- (ii) the projections covered from 2019 to 2044 including 5 years of implementation (2020–2024) and assets created were assumed to have a 20 years’ lifespan upon project completion (2025–2044);
- (iii) economic costs for construction and operation and maintenance (O&M) are calculated from the financial cost estimates; price contingencies, and taxes and duties are excluded, but physical contingencies are included;
- (iv) for evacuation of power from the WTE plant to Gulhifalhu island, overhead cable connection cost of USD7.0 million and O&M for transmission line is assumed at USD0.05 million per annum;
- (v) the economic opportunity cost of capital (EOCC) is assumed at 9% in real terms; and
- (vi) all costs including capital works and O&M are valued using the domestic price numeraire; unskilled labor is adjusted by shadow wage rate factor of 0.87, tradeable inputs are adjusted by the shadow exchange rate factor of 1.07.

4. **Project benefits.** The expected project benefits include: (i) benefits from reduction in health expenditure to the residents in the project area (i.e., *non-incremental benefits*), (ii) avoided land reclamation cost (i.e., *incremental benefits*) and (iii) resale value of the by-products of the

processed waste including power, bottom ash and metal generated from the WTE plant (i.e., *incremental benefits*).

5. **Non-Incremental benefits.** Economic benefits considered under '*non-incremental*' benefits include savings in health expenditures due to reduction in diseases related to improper handling of solid waste management. This has been calculated as savings in health expenses due to reduction in parasitic/vector diseases, intestinal nematode infections, and lower respiratory diseases in the 'without project' scenario through the intervention of WTE project.

6. **Incremental benefit.** Economic benefit expected under '*incremental*' includes the annual by-products available for sale from the proposed WTE project and avoided land reclamation cost. From the operation start year (2025), 64,824 MWh of electricity after accounting for 7.5% transmission and distribution loss, 21,000 tons of bottom ash and 3,360 tons of metal is estimated to be generated from the WTE annually. The generated electricity and the resale value of other by-products (bottom ash and metals) are considered as incremental benefit. Considering the unit rates and the projected by-products under different categories during the operation period (2025–2044), the additional revenue is considered as incremental benefit. Avoided land reclamation cost has been added as non-incremental benefit because, in absence of WTE project, existing landfill site will not be able to meet higher supply of solid waste from 2035 and there will be need for further land reclamation as there is not sufficient land in the existing facility.

7. The Economic Benefits from each component is given in the table below:

<b>Category</b>	<b>Unit rate</b>	<b>Total Benefits (ENPV) (USD million)</b>
<i>Non-incremental benefits</i>		
<i>Savings in health expenditure<sup>1</sup></i>	USD47.6/person/year	100.7
<i>Incremental Benefits (revenue from WTE plant)</i>		
<i>Production cost for sold electricity<sup>2</sup></i>	USD408/MWh	128.2
<i>Revenue from sale of bottom ash<sup>3</sup></i>	USD3.7/ton	0.4
<i>Revenue from sale of metals<sup>4</sup></i>	USD37.5/ton	0.7
<i>Avoided land reclamation cost<sup>5</sup></i>	USD15 million (2032-2034)	3.8

<sup>1</sup> Savings in health expenditures = Average per capita annual health expenditure (\$821) x incidence of diarrheal diseases, skin diseases, parasitic/vector diseases and respiratory related diseases caused by existing SWM disposal system (7.2%) x 80% = \$47.6/person/year. While the main cause of diarrheal diseases, skin diseases, parasitic/vector diseases and respiratory related diseases is the open dumping and burning of waste, even after operation of the WTE plant, it's not realistic to assume all of these diseases will go away. Hence 80% attribution.

<sup>2</sup> As a proxy to 'willingness to pay' price, average of diesel-based electricity production cost escalated to 2019 and commercial power tariff for bulk users in 2019 (\$0.41/KWh) or \$408/MWh is considered for analysis.

<sup>3</sup> Recommended price for the bottom ash produced from the waste to energy plant is \$5/ton. 75% of the unit rate suggested is assumed for analysis to accommodate the price risk (\$3.7).

<sup>4</sup> Recommended price for the metals collected from the waste to energy plant is \$50/ton. 75% of the unit rate suggested is assumed for analysis to accommodate the price risk (\$37.5).

<sup>5</sup> Avoided land reclamation economic cost of \$12.35 million spread out in three years during 2032-2034 and \$2.65 million maintenance for landfill annually distributed during 2037-2044

8. **Results:** The Economic Internal Rate of Return (EIRR) was estimated at 17.8% and the Economic Net Present Value (ENPV) at USD90.4 million. The detailed results are given in the following table:

Year	Construction cost	O&M cost	Total cost	Health Benefit	Revenue Electricity sales	Revenue Bottom ash sales	Revenue Metal sales	Avoided land reclamation	Total Benefits	Net benefits
2020	0.4	0.0	0.4	-	-	-	-	-	-	-0.4
2021	20.3	0.0	20.3	-	-	-	-	-	-	-20.3
2022	34.5	0.0	34.5	-	-	-	-	-	-	-34.5
2023	36	0.0	36.0	-	-	-	-	-	-	-36
2024	50.1	0.0	50.1	-	-	-	-	-	-	-50.1
2025	1.2	9.0	10.2	12.3	18.1	0.1	0.1	-	30.5	20.3
2026	0.4	9.0	9.3	16.7	24.2	0.1	0.1	-	41.0	31.7
2027	-	9.0	9.0	17.0	24.2	0.1	0.1	-	41.4	32.4
2028	-	9.0	9.0	17.3	24.2	0.1	0.1	-	41.7	32.7
2029	-	9.0	9.0	17.7	24.2	0.1	0.1	-	42.0	33.1
2030	-	9.0	9.0	18.0	24.2	0.1	0.1	-	42.4	33.4
2031	-	9.0	9.0	18.4	24.2	0.1	0.1	-	42.8	33.8
2032	-	9.0	9.0	18.8	24.2	0.1	0.1	4.1	47.3	38.3
2033	-	9.0	9.0	19.2	24.2	0.1	0.1	4.1	47.7	38.8
2034	-	9.0	9.0	19.7	24.2	0.1	0.1	4.1	48.1	39.2
2035	-	9.0	9.0	20.1	24.2	0.1	0.1	-	44.5	35.5
2036	-	9.0	9.0	20.5	24.2	0.1	0.1	-	44.9	35.9
2037	-	9.0	9.0	21.0	24.2	0.1	0.1	0.3	45.7	36.7
2038	-	9.0	9.0	21.4	24.2	0.1	0.1	0.3	46.1	37.2
2039	-	9.0	9.0	21.9	24.2	0.1	0.1	0.3	46.6	37.6
2040	-	9.0	9.0	22.4	24.2	0.1	0.1	0.3	47.1	38.1
2041	-	9.0	9.0	22.9	24.2	0.1	0.1	0.3	47.6	38.6
2042	-	9.0	9.0	23.4	24.2	0.1	0.1	0.3	48.1	39.1
2043	-	9.0	9.0	23.9	24.2	0.1	0.1	0.3	48.6	39.6
2044	-	9.0	9.0	24.4	24.2	0.1	0.1	0.3	49.1	40.1
	142.8	179.4	322.2	397.2	477.0	1.6	2.5	15	893.2	571.1
<b>ENPV</b>	<b>94.5</b>	<b>48.8</b>	<b>143.3</b>	<b>100.7</b>	<b>128.2</b>	<b>0.4</b>	<b>0.7</b>	<b>3.8</b>	<b>233.8</b>	<b>90.4</b>
<b>EIRR</b>										<b>17.8%</b>

9. Given that the presence of positive externalities (including public health and environmental benefits) is not considered, this analysis establishes an overall lower bound of the economic viability of this Project. The actual economic benefit, and hence, EIRR and ENPV is expected to be considerably higher.

10. **Sensitivity analysis** has been carried out with respect to i) a 20% increase in construction cost, ii) a 20% increase in O&M cost, iii) a 20% decrease in benefits, iv) a delay in operation by one year, and v) a worst-case scenario combining all of the beforementioned scenarios and (vi)

power sale at 2 MW. The EIRR remains above the EOCC of 9% for all the scenarios. The following table provides the EIRR and ENPV under each sensitivity scenario:

Particulars	EIRR%	NPV @ 9% (USD Million)
Base case	17.8%	90.4
Construction cost increase (+20%)	15.1%	71.5
O&M cost increase (+20%)	17.0%	80.7
Benefit decrease (-20%)	13.6%	43.7
Delay in operation by one year	17.7%	79.0
Combined Worst Scenario	10.2%	11.0
Power sale at 2 MW and without transmission cost	10.8%	16.3

## B. Financial Analysis

11. **Methodology and approach.** Under the existing institutional arrangements, Waste Management Corporation (*WAMCO - a government owned corporation established in 2015*) is responsible for collection and transportation of waste from Malé and outer islands in the project area to Thilafushi where the waste is currently dumped in the open dumpsite. WAMCO charges a user fee for waste collection. However, at present, WAMCO tariff policy for waste collection and transfer is not premised on full cost recovery. As there is no existing waste processing facility, there is no dedicated tipping fee structure for waste processing in the Maldives.

12. The WTE facility under the project would be owned by Ministry of Environment (MOE) and a private contractor will operate it on a DBO contract with a 15-year operation service period. MOE will have expenses of annual operation and maintenance (O&M) payout to the private contractor. With this premise, a financial analysis has been carried out to assess the cash flow of the WTE project from the possible revenue sources to cover the O&M costs.

### 13. Key assumptions:

- (i) The projection was carried from 2020 to 2044 including 5 years of implementation during 2020–2024. Assets established were assumed to have 20 years lifespan upon the completion (conservative estimate);
- (ii) considering the start-up issues, only 75% of the estimated revenue is considered for the start year 2025;
- (iii) The O&M costs included personnel, maintenance, replacement, administrative, operation and exclude depreciate expenditure which is a non-cash item;
- (iv) As MOE will own the WTE facility, tax implications will not arise;
- (v) The annual pay-out estimated for the WTE plant (including the annual operating expenses, asset replacement during the 20 years operation and the profit) and administrative expenditure for MOE to manage the operation are considered for O&M. Although annual payment to DBO operator is subject to bid outcome, estimated annual payment is an average of payment over contract period. Annual payments are estimated

starting from first year of operation i.e. 2025. Appropriate inflation factor has been used to estimate this average annual payment amount.

(vi) All costs are in 2019 constant prices and converted at \$1 = Rf15.4;

(vii) Revenue from the sale of by-products (USD100/MWh for electricity, USD37.5/ton for metals and USD3.75/ton for bottom ash) from the WTE plant is considered, along with 15% increase once in 5 years; and

(viii) Tipping (or disposal) fee of USD32/ton for resort waste is considered, along with 15% increase once in 5 years (based on current disposal tariff of Rf. 424/ton for resort waste delivered directly to Thilafushi).

#### 14. **Revenue sources:**

The project would generate revenues from

- a. sale of power generated from the WTE plant
- b. sale of by products such as metals and bottom ash
- c. tipping fee/disposal fee for the waste delivered to WTE facility

15. **Sale of power:** State Electric Company Limited (STELCO), the state company for electricity, plans to purchase the electricity at a minimum feed in tariff rate of \$100 per MWh. This is the minimum assurance provided by Ministry of Finance (MOF), MOE, and STELCO through a tripartite memorandum of understanding. The tariff is also in line with power purchase agreement rate of USD99.6 per MWh signed between STELCO and a private operator for a proposed 5 MW solar photovoltaic plant. Supporting infrastructure required to sell WTE surplus power needs to be in place (overhead cable connection to Gulhifalhu island, where international commercial harbor is under development). MOF and MOE has provided assurance that all electricity produced by WTE facility will be absorbed into the grid and sold to STELCO through a power purchase agreement.

16. **Sale of by-products:** In the absence of fixed sale rates, a market analysis-based rates for the two by-products metals and bottom ash has been assumed for analysis. As per the feasibility study, recommended price for the bottom ash produced and metals collected from the waste to energy plant are USD5/tonne and USD50/tonne respectively. However, 75% of the unit rate suggested is assumed for analysis to accommodate the price risk i.e. USD3.75/ton for bottom ash and USD37.5/ton for metals. Market for the by-products produced by the WTE treatment process including electricity, bottom ash and metals are available in Maldives.

17. **Tipping fee/disposal fee tariff structure:** At present, the waste collection operation by WAMCO is guided by the 'tariff-based revenue generation approach' in line with the existing policy framework under the National Solid Waste Management policy (2015) and Solid Waste Management Regulations (2013). Under this framework, WAMCO collects all user fee from the SWM customers and dumps the collected waste without treatment at Thilafushi island. Under the proposed system, the WTE plant operator will be responsible for the processing of waste collected and transported by WAMCO. In the long run, MOE is planning to introduce a comprehensive fee for waste treatment and disposal for all the waste generated. Under the existing institutional system, the proposed fee can be collected from WAMCO which will deliver the waste to WTE



facility and can systematically pass on this tipping fee (through established tariff system) to the SWM users. However, MOE intends to implement this only after improving the service delivery and till then MOE will support the O&M funding through tax, transfers, and trade of by-products.

18. **Results.** The cash flow projections show that the proposed WTE plant could cover only part of O&M costs from the operation start year of 2025–2035 when full O&M cost recovery is achieved, which underlines the need for O&M support from MOE. Potential budget shortfalls to pay any O&M gap pose a substantial financial sustainability risk. To address this risk, the government ensured that it will cover any O&M shortfall either through fund from Maldives Green Fund (tax) or other budgetary allocations and will establish a clear fund flow arrangement for paying the DBO operator on time to ensure service continuity. The government has agreed to an O&M financing plan describing revenue sources for O&M financing, potential funding gaps and ministerial responsibilities for covering O&M shortfall, which will be finalized one year before commencement of O&M and supported by the project. The detailed cost recovery analysis is given below:

#### Cost recovery analysis (USD million)

<i>Details</i>	<b>2025</b>	<b>2029</b>	<b>2032</b>	<b>2035</b>	<b>2038</b>	<b>2041</b>
<i>Sale of Power</i>	5.2	7.9	7.9	9.1	9.1	10.5
<i>Sale of Metals</i>	0.1	0.1	0.1	0.2	0.2	0.2
<i>Sale of Bottom ash</i>	0.1	0.1	0.1	0.1	0.1	0.1
<i>Disposal fee for waste</i>	0.6	0.7	0.9	1.1	1.3	1.7
<i>Operating income</i>	5.9	8.8	9.0	10.5	10.7	12.5
<i>Payments to WTE operator</i>	9.7	9.9	9.9	9.9	9.9	9.9
<i>Others</i>	0.6	0.6	0.7	0.7	0.7	0.7
<i>Operating expenses</i>	10.3	10.5	10.6	10.6	10.6	10.6
<i>Net operating income</i>	-4.4	-1.7	-1.5	0.0	0.1	1.8
<i>Tax</i>	0.0	0.0	0.0	0.0	0.0	0.0
<i>Net cash flow</i>	-4.4	-1.7	-1.5	0.0	0.1	1.8
<i>Operating ratio (&lt;1)</i>	1.7	1.2	1.2	1.0	1.0	0.9

#### C. Sensitivity analysis

19. Since sale of electricity to STELCO is the main driver of revenue for the WTE plant, a sensitivity analysis is carried out under the following scenario: power sales is 2MW with 3% annual increase, with the assumption that growth on Thilafushi is lower than projected by the government and no overhead transmission line to Gulhifalhu island is implemented. This is the worst-case scenario where O&M recovery is on average only 43%. The Green Fund will be able to cover the funding gap until a comprehensive waste treatment and disposal tariff structure is made operational. The sensitivity analysis for this scenario is as follows:

**Sensitivity analysis for cost recovery (USD million)**

<b>Details</b>	<b>2025</b>	<b>2029</b>	<b>2032</b>	<b>2035</b>	<b>2038</b>	<b>2041</b>
Operating income	2.6	3.4	3.8	4.8	5.2	6.6
Operating expenses	10.2	10.2	10.2	10.3	10.3	10.3
Net operating income	-7.5	-6.8	-6.4	-5.5	-5.1	-3.7
Operating ratio (<1)	3.9	3.0	2.7	2.1	2.0	1.6

## Annex 4: Sovereign Credit Fact Sheet<sup>1</sup>

### A. Recent Economic Development

1. Maldives is an upper middle-income country with GDP per capita at USD 10,330.6 and a population of 557,426 in 2020. After growing at an average annual rate of 6.7 percent during 2016 to 2018, growth decelerated to 5.7 percent in 2019. Government infrastructure investment, tourism and construction have been the main drivers of investment in recent years. The growth slowdown in 2019 was due to decrease in construction activity as several large infrastructure projects concluded and many government projects were delayed. There was a strong growth in tourism receipts in 2019 as the number of tourists reached a record 1.7 million aided by increased flight connections and opening of new resorts. Marine exports, another important driver of growth, declined as both demand and prices fell.

2. Overall inflation remained subdued at 1.3 percent mainly due to government's price controls on key staples and lower global oil and food prices. Low inflation also reflected government policies that lowered prices of food, electricity, and transport. Low inflationary pressure allowed the central bank to maintain an accommodative policy stance.

3. The fiscal deficit widened to 5.6 percent of GDP in 2019 driven by higher recurrent expenditure like higher salaries of civil servants whose pay structure was revised in 2018. Recruitment of new employees in the public sector also pushed up the wage bill. Capital expenditure remained weak. A substantial increase in grants helped overall revenue to grow even as domestic revenue grew at a subdued pace owing to slower economic growth. Government debt increased during 2019 with the government borrowing both from domestic and international lenders.

4. Despite strong growth, the country faced stress on its external account. Maldives' current account deficit remained over 26.0 percent of GDP for the second year in a row. Imports of construction goods, machinery and electrical equipment slowed down as investment tapered off. Marine exports witnessed a decline due to weak global demand. The current account deficit was primarily financed by foreign direct investment and other investment liabilities incurred by public sector enterprises with government guarantees. Maldives had issued a USD250 million 5-year bond in 2017 and a USD100 million private placement sovereign bond in 2018. The country's external debt crossed 50% of GDP in 2019. Maldives is included in the list of Zero Non-Concessional Borrowing (Zero-NCB) Limit Countries by the World Bank Group (last updated on January 2020).<sup>2</sup>

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<sup>1</sup> The numbers and ratios reflected in this annex are IMF estimates as of April 2020 and may vary from GOM latest estimates.

<sup>2</sup> Source: List of IDA-only and PRGT-eligible Countries Subject to IMF/World Bank Group Debt Limits Conditionality, last updated on April 30, 2019

## B. Economic Indicators

### Selected Macroeconomic indicators (2017-2022)

Economic Indicators	2017	2018	2019	2020*	2021*	2022*
Real GDP growth	6.8	6.9	5.7	-8.1	13.2	6.4
Inflation (% change, average)	2.3	1.4	1.3	1.5	1.5	2.0
Current account balance (% of GDP)	-21.7	-26.4	-26.1	-23.1	-11.8	-9.2
Central government overall balance (% of GDP)	-6.3	-5.1	-4.8	-11.7	-6.2	-4.9
Nominal gross public debt (% of GDP)	61.3	71.3	76.9	93.9	87.3	85.4
Public gross financing needs (% of GDP)	7.7	6.7	8.6	13.0	10.1	13.8
External debt (% of GDP)	35.6	50.4	54.2	69.0	65.3	61.5
Gross external financing need (% of GDP)	17.0	20.9	15.4	21.2	8.6	10.0
Net Foreign Direct Investment Inflow (% of GDP)	9.7	10.8	15.5	6.0	8.5	8.7
Gross reserves (months of imports)	1.7	2.1	2.9	2.0	2.3	2.2
Broad money growth (M2, % change)	5.2	3.4	7.8	-5.9	16.0	8.5
Exchange rate (MVR/USD, EOP) ***	15.4	15.4	15.4	15.4	-	-

Note: \* denotes projected figures.

\*\* denote projected figures from 2018

\*\*\* FX rate from Thomson Reuter, 2020 FX data as of April 5, 2020

Source: IMF World Economic Outlook, April 2020 and IMF Country Report No. 20/133

## C. Economic Outlook and Risks

5. Maldives' economy is expected to contract by 8.1 percent in 2020 due to the COVID-19 pandemic, which is expected to dent the country's tourism receipts that directly and indirectly account for nearly two-third of the GDP. Decline in tourism earnings is likely to create financial constraints for construction activity. Supply of construction materials, especially imported materials, is expected to be impacted due to COVID-19 related disruption, thereby further denting construction activity. The global spread of COVID-19 is also expected to push many low-income agrarian families into poverty as prospects for marine exports decline due to weak demand in key export destinations. However, growth is expected to rebound in 2021 under the assumption that once the COVID-19 pandemic is over, tourism would make a strong rebound as pent-up demand is released.<sup>3</sup>

6. Inflation is expected to remain stable due to ongoing subsidies and price controls introduced by the government on electricity and staples. Lower oil prices would also help in maintaining low inflation. Inflation might increase slightly due to supply chain disruptions of imported products during the COVID-19 pandemic, which can create temporary shortage.

7. Fiscal deficit is expected to more than double to 12 percent of GDP in 2020, compared to 2019, as the government has announced an economic recovery plan of about 2.8 percent of GDP. On the revenue side, shortfalls are expected as tourism-related receipts plunge and economic activity declines. The government intends to cut other expenditure by 1.2 percent of GDP to offset the decline in receipts. The central government debt is expected to rise in 2020 with the government looking for additional resources to meet the fiscal gap.

<sup>3</sup> According to IMF's World Economic Outlook 2020, the baseline scenario assumes that the pandemic fades in the second half of 2020 and containment efforts can be gradually unwound.

8. The current account deficit is projected to decrease slightly to 23.1 percent of GDP in 2020 as reduction in the oil import bill might offset the reduction in tourism receipts. Supply side disruptions would also reduce import of construction material and related capital goods. An anticipated recovery in tourism earnings in 2021 will result in further reduction of the current account deficit. Over the medium-term the current account deficit is expected to improve as major infrastructure projects are set to complete and enhanced fishing capacity will help boost fish exports.