ASIAN INFRASTRUCTURE INVESTMENT BANK

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Project Document
of the Asian Infrastructure Investment Bank

Sovereign-Backed Financings

Republic of Maldives

Maldives Solar Power Development and Energy Storage Solution

Currency Equivalents
(As of February 09, 2021)

Currency Unit – Maldives Rufiyaa (MVR)
MVR1.00 = USD0.065
USD1.00 = MVR15.40

Borrower's Fiscal year
Jan. 1-Dec. 31

Abbreviations

ADB	Asian Development Bank
AIIB	Asian Infrastructure Investment Bank
ASPIRE	Accelerating Sustainable Private Investments in Renewable Energy
BESS	battery energy storage system
CTF	Clean Technology Fund
DA	Designated Account
EBITDA	earnings before interest, taxes, depreciation and amortization
EHS	Environmental, Health and Safety
EIRR	economic internal rate of return
ENPV	economic net present value
ESF	Environment and Social Framework
ESMAP	Energy Sector Management Assistance Program
ESMF	Environmental and Social Management Framework
ESP	Environmental and Social Policy
FIRR	financial internal rate of return
GDP	gross domestic product
GHG	greenhouse gas
IDA	International Development Association
IMF	International Monetary Fund
IPP	independent power producer
IUFR	Interim Unaudited Financial Report
kWh	kilowatt hour
MDB	multilateral development bank
MIGA	Multilateral Investment Guarantee Agency
MWh	megawatt hour
O&M	operation and maintenance
PPSD	Project Procurement Strategy for Development
PMU	Project Management Unit
POISED	Preparing Outer Islands for Sustainable Energy Development

PPA	power purchase agreement
PSC	Project Steering Committee
PTC	Project Technical Committee
PV	photovoltaic
STELCO	State Electric Company Ltd
STO	State Trading Organization Plc
TA	technical assistance
VRE	variable renewable energy

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Republic of Maldives
Maldives Solar Power Development and Energy Storage Solution

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The project comprises of the following components:

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Cofinancing (Size and Terms)	Lead cofinancier [1] (IDA grant USD12.4 million, CTF concessional loan and grant USD30 million and Multilateral Investment Guarantee Agency [MIGA] guarantee USD40 million)
Environmental and Social Category	World Bank Category Moderate Risk (Equivalent to Category B if AIIB's Environmental and Social Policy [ESP] was applied)
Risk (Low/Medium/High)	Medium
Conditions of Effectiveness	(i) Execution of cofinancing agreement between AIIB and the cofinancier; (ii) execution of cofinancier's loan/grant agreement
Conditions for Disbursement	(i) The Project Operations Manual shall be adopted within 30 days as of the date of effectiveness; (ii) Terms of reference and the composition of the Project Management Unit (PMU) shall be updated within 30 days as of effectiveness
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, Investment Operations (Region 1)	D.J. Pandian
Director General, Technical Department (Region 1)	Rajat Misra, Acting Director General
Manager	Rajat Misra, Manager
Team Leader	Amit Kumar, Senior Investment Operations Specialist
Team Members	Bernardita Saez, Senior Counsel David Morgado, Senior Energy Policy Specialist Gerardo Pio Parco, Senior Environmental Specialist Irish Fe Aguilar, Social Development Specialist Sunhye Park, Young Professional Wei Huang, Energy Policy Associate Yangzom Yangzom, Procurement Specialist Yogesh Malla, Financial Management Specialist

[1] IDA acting on its behalf and in its capacity as an implementing entity of the CTF.

2. Project Description

A. Rationale

1. **Country Priority.** Demand for electricity has risen steadily over the last decade in Maldives, reflecting robust economic growth. From 2007 to2017, total electricity consumption grew by 6.2 percent annually on average, outpacing average annual gross domestic product (GDP) growth rate. As Maldives relies heavily on imported diesel to meet majority of its power needs, reducing dependence on imported fuel and investing in renewable energy is a key priority of the Government of Maldives.

2. **Institutional Context**. The national Strategic Action Plan for the Maldives (2019-2023) (SAP) includes a specific pillar for "Clean Energy" with clear renewable energy targets to: (i) increase the share of renewable energy in the energy mix by 20 percent compared to 2018 levels, (ii) reduce fossil fuel usage for electricity generation by 40 million liters and (iii) increase renewable energy storage capacity to 30 MWh. By 2023, Maldives plans to have 75 MW of solar capacity installed.

3. At the UN Climate Action Summit in 2019, Maldives' minister of environment announced the target to increase the share of renewables in the country's energy mix to 70 percent by 2030, an ambitious target compared to four percent renewable energy mix in 2019. The Parliamentary address by the President of Maldives in February 2020 refers to 51 MW worth of solar energy projects already in the pipeline, expected to commence in 2020.[1]

4. **Investment Needs**. Investments over USD300 million will be required to achieve the SAP 2019-2023 renewable target set by Government of Maldives, including: (i) USD60 million-USD90 million to procure solar PV, (ii) USD60 million-USD90 million for battery energy storage systems (BESS) and (iii) USD75 million-USD120 million in grid upgrades. An additional USD1 billion of investment would be required to achieve the 2030 target of increasing renewable generation capacity to 70 percent.[2] World Bank estimates that under the 2030 target, the fuel subsidies for electricity would be reduced by 44 percent. As a reference, in 2019, the fuel subsidy paid by the government to the State Trading Organization (STO) amounted to approximately USD31.7 million, and the usage subsidy paid to the utilities amounted to USD30.4 million.

5. **Generation Capacity.** At present, in Maldives there are 186 powerhouses on inhabited islands—excluding industrial islands and resort islands where service is provided by the private sector (resort operators)—collectively generating 319 MW from diesel and 21.5 MW from solar PV. The total annual electricity consumption in the country was 750 gigawatt-hours in 2018, much higher on a per capita basis than other countries in the region, but lower than the average upper

[1] The President's Office, Republic of Maldives. 2020. UNOFFICIAL TRANSLATION OF THE PRESIDENTIAL ADDRESS, 2020. 3 February. https://presidency.gov.mv/Press/Article/23042.
[2] World Bank. 2020. Maldives Development Update: In Stormy Seas.

middle-income country.[3] More than half of electricity consumption is concentrated in the capital city of Malé, and while Malé has the largest power system with an installed capacity of 81MW, there are only four other islands that have generation capacity larger than 1 MW. Each island has its own powerhouse and distribution facility, and operates as single, isolated power grids, except for Malé-Hulhumalé, where a transmission line connection is expected to be completed in 2021; and Laamu atoll, where a grid has been established to connect multiple islands. The highly dispersed nature of these power systems further poses challenges to system operation and flexibility.

6. Two major state-owned utilities—State Electric Company Ltd (STELCO) and FENAKA Corporation Ltd (FENAKA) —that supply majority of the power supply in the country rely heavily on the government for budget transfers and subsidies. STELCO serves 35 islands, including the Greater Malé area which accounts for 57 percent of the electricity consumption in the country, while FENAKA serves 152 islands outside of the Greater Malé region.

7. **Reliance on Diesel Generation**. The electricity sector in Maldives is heavily reliant on diesel fuel for power generation. Diesel imports range from USD240 million-USD400 million annually, which is equivalent to about 10 percent of GDP. End-user tariffs are insufficient to cover the generation costs and despite significant budgetary support from government, the electricity sector is not financially sustainable. Costs for the most efficient diesel generator in the Maldives are estimated to range from 19 to 33 US cents/kilowatt hour (kWh), while for many of the outer islands, costs can be as high as 69 US cents/kWh. As a result, Maldives has one of the highest end-user electricity tariffs in South and Southeast Asia.

8. The Government of Maldives provides two types of subsidies to reduce costs for the end-users. First, the government indirectly subsidizes the purchase of imported fuel by public utilities through the STO to address the volatility in fuel prices. Second, the government provides direct usage subsidies by compensating the utilities for revenue losses incurred as a result of reductions in the retail electricity tariff, introduced by the government when it harmonized domestic and business category tariffs across all islands. Maldives' high dependency on fuel and usage subsidies not only presents challenges in diversifying its energy mix, but also has adverse fiscal implications. The fuel subsidies to STO combined with tariff subsidies to state utilities reached approximately USD58 million in 2019, approximately one percent of GDP.

9. Despite the government's clean energy ambitions, the scope of public sector investment has been limited due to fiscal constraints. Further, the current investment climate for the private sector is in its nascent stage. As such, private developers and lenders have faced challenges investing in the electricity sector. In Maldives, the market perceives off-taker risk to be high primarily due to its reliance on government subsidies as the retail electricity tariff is not cost-reflective. In addition, the limited track record is an additional hurdle for utilities to engage in power

[3] Per capita electricity consumption is about 1.8 MWh per person in the Maldives, compared to 0.7MWh per person on average in South Asian countries and 3.5 MWh per person on average in upper middle-income countries. Source: World Development Indicators and Energy Information Administration.

purchase agreements (PPAs) with independent power producers (IPPs). Notably, STELCO has signed three PPAs: the first PPA was signed in 2011 by STELCO with a private developer for up to around 650 kW under its own initiative, at a rate of 25 US cents/kWh for 20 years; the second PPA for 1.5 MW solar PV, with a tariff of 21 US cents/kWh for 20 years and recently a third PPA for an additional 5 MW, with a tariff of 10.9 US cents/kWh for 15 years. The second and the third PPAs were tendered under the Accelerating Sustainable Private Investments in Renewable Energy (ASPIRE) project. At the moment, FENAKA has no experience with IPPs, but the model is also expected to be replicated in outer islands where sufficient scale can be achieved. Further, currency inconvertibility risk exists for PPAs denominated in US dollars and payable in Maldives Rufiyaa (MVR). As a result of the abovementioned constraints, installed renewable energy capacity accounts for only four percent of the country's energy mix in 2019.

10. Finally, the small island grid systems are not sufficiently flexible to integrate significant variable renewable energy (VRE) sources. The existing power transmission and distribution networks will need to be upgraded to be able to accommodate the intermittency of renewable energy and avoid network overloading. In addition, the grid systems in some islands are outdated and are overdue for upgrades. The average energy loss is currently estimated at eight percent in grids in the Greater Male region and around 12 percent in other inhabited islands. The unique geographical characteristics of the country present additional challenges, as the cost of installing submarine cable interconnection between the islands could be higher than a typical overhead transmission line.

11. **Strategic Fit for AIIB.** By increasing the renewable energy generation capacity and enabling its integration into the grid system, the proposed project is aligned with AIIB's strategy on sustainable energy for Asia as well as the strategy on mobilizing private capital for infrastructure in terms of:

I. Supporting electricity generation from renewable energy source and facilitating integration of VRE to the grid in Maldives.

II. Improving energy security and climate resilience by using domestic renewable energy resources and diversifying the energy mix in Maldives.

III. Mobilizing private capital for clean energy development.

12. **Value Addition by AIIB**. AIIB will play a vital role in closing the financing gap for the critical investment in Maldives' renewable energy and associated electricity distribution infrastructure. AIIB's long-term financing support will help the borrower reduce the financing uncertainty for this project, which is ever more crucial as the Government of Maldives and the public utilities have been financially constrained to make critical infrastructure investments due to COVID-19 pandemic. Moreover, AIIB has been working closely with World Bank to streamline project preparation and ensure project implementation readiness, particularly since the project includes multiple interdependent components that aim to tackle various challenges in developing renewable energy capacity in Maldives. Further, AIIB, in collaboration with World Bank, will provide continued support to the Project Management Unit (PMU) to enhance its capacity to meet

the standards in procurement and environmental and social management of multilateral development banks (MDBs).

13. **Value Addition to AIIB**. AIIB will be supporting an innovative and integrated approach to tackle Maldives' challenge in renewable energy development. The project provides AIIB an opportunity to participate in providing a comprehensive solution along the value chains to reap long-term sustainable benefits for the client, including but not limited to financing, technology, capacity installation, storage and institutional capacity building. In addition, the proposed project will provide opportunities for AIIB to work closely with the lead cofinancier World Bank and strengthen the partnership. Further, the project will help solidify AIIB's status as a trusted partner in the country, as this project will be AIIB's first sovereign financing in Maldives' energy sector. The project is also AIIB's first investment in a project that combines solar PV and battery solution. The project also provides good opportunity for AIIB to replicate the solutions and lessons learned to other regions or countries with similar challenges.

14. **Lessons Learned from Previous Projects.** The project builds on the Government of Maldives' experience over a series of solar PV generation projects in the last few years, which includes World Bank's ASPIRE project. The ASPIRE project, in particular, has provided significant learning experience for the Ministry of Environment, which will be the implementing agency for the solar development and energy storage solution project, and has informed the design of the project especially on utilizing the IPP model in Maldives. In addition, the Asian Development Bank (ADB) and the Ministry of Environment has commenced the implementation of the Preparing Outer Islands for Sustainable Energy Development (POISED) project, which includes installing solar battery-diesel hybrid systems and upgrading the distribution grids in 48 islands out of the 160 inhabited islands.[4] The AIIB team notes the following lessons from implementation of previous MDB-funded solar projects in Maldives:

I. Ensuring completion of a detailed structural and siting analysis of rooftop solar and other solar project sites for each subproject before issuing a Request for Proposal.

II. The importance of working closely with local authorities and building occupants of rooftop solar sites early on in the preparation phase.

III. The importance of working across the ministries and other government institutions to ensure coordination in a timely manner.

IV. Using the "tariff buydown"[5] funds to ensure that the PPA price is acceptable to the purchasing utility.

V. Building capacity and acceptance within the government and the utilities on the commercial and technical aspects of renewable energy, in general, and of the subprojects, in particular. To incorporate these lessons, PMU has enhanced its

[4] Under the POISED project, approximately 11.2 megawatt peak of solar PV facilities, 5.7 MWh of battery energy storage systems and 11.6 MW of energy efficient diesel generation sets were installed.
[5] This is a cash transfer to the winning bidder upon proof of built capacity and performance.

capabilities and knowledge in these areas and is developing the proposed project in close coordination with all relevant stakeholders.

B. Project Objective and Expected Results

15. **Project Objective.** The project aims to increase generation capacity from renewable energy sources and to facilitate the integration of renewable energy into Maldives' grid infrastructure.

16. **Expected Results.** The project's outputs include increased generation capacity from renewable energy and the integration of renewable energy, which can be measured using the following key indicators. More details are provided in Annex 1.

I. Renewable energy generation capacity constructed or rehabilitated under the project (MW).

II. Private capital mobilized (USD million).

III. Electrical transmission and distribution lines constructed (medium- and low-voltage) and/or rehabilitated (kilometers).

IV. Greenhouse gas emission reduction (metric tons of carbon dioxide [CO_2] equivalent per year).

V. Installed capacity of BESS (MWh).

17. **Expected Beneficiaries.** Project beneficiaries are government and end-consumers on the islands where the solar PV installations will be installed. The proposed project will target consumers in Greater Malé Area, Addu, Fuvahmulah and the outer islands of Maldives. The newly installed solar PV facilities will be replacing future capacity that would have otherwise been diesel generators. Therefore, it also provides the immediate benefit of reduced noise and air pollution for the citizens due to reductions in the running time of diesel-powered engines. The government will benefit from reduced subsidies and burden on the balance of payments, which will help shore foreign exchange reserves. By bringing private investments to the power sector, the project will free up the government budget for allocation to other development needs such as education and health. In addition, the project will help develop local presence and expertise in renewable energy, which will expand employment prospects through the development of renewables and related disruptive technologies.

C. Description and Components

18. **Overview**. The project involves the development of 36-megawatt solar power projects and 50 MWh of battery energy storage solutions across various islands in Maldives. The project also involves grid modernization for the integration of variable renewable energy (VRE), as well as technical assistance for institutional capacity building, pipeline development and support for early

stage feasibility work associated with the development of other sustainable energy sources (including electric mobility, wind and wave energy and green hydrogen).

19. **Component 1**. **Solar PV Risk Mitigation (USD6.2 million IDA grant, USD4.0 million CTF grant and USD45 million private sector financing).** This component aims to support the mobilization of total USD45 million of private sector investments to deploy solar PV capacity through an IPP model. As a strategy to facilitate a conducive environment to attract USD45 million of private sector financing, Component 1 provides a combination of risk-mitigating package using IDA grant and Multilateral Investment Guarantee Agency (MIGA) guarantee to private sector IPPs to cover the following:

- Tariff buydown (USD6.2 million IDA grant): It will provide tariff buydown grant for solar PV IPPs, in particular floating solar PV applications which are expected to be more costly. The amount to be paid will be linked to the performance of the IPP.

- Liquidity coverage (USD4.0 million CTF grant): It will be used to fund escrow accounts to backstop ongoing payments by STELCO and FENAKA under PPAs to cover a predetermined number of months of payments, e.g., six months. The escrow account will then be available to be drawn down in case of PPA payment delays from the off-taker to the IPP project company and thus, works as a part of payment security mechanism. This will be constructed under an escrow agreement that will require the off-taker and the Government of Maldives to replenish the account within a predetermined period.

- MIGA guarantee (USD40 million, excluded from project financing plan): Indicative guarantee terms from MIGA will be included as part of the bidding package and it will be offered to cover the following risks: (1) termination risk through its breach of contract coverage, (2) transfer restriction, (3) expropriation and (4) war and civil disturbance risk to cover political risk insurance-related country risks.

20. IPPs will be selected through competitive tendering for designing, financing, constructing, and operating solar power generation facilities, including rooftop solar PV, ground-mounted solar PV and floating solar PV applications, targeting about 36 MW of cumulative installed capacity across the islands, under fixed-term PPAs. Given the land constraints in Maldives, PMU will identify a number of suitable sites for each bidding phase. The prequalification document for the first two subprojects totaling 21 MW in the IPP pipeline was launched in Q1 2020. Out of the two lots offered for prequalification, 24 applications were received for floating solar PV and 34 applications were received for ground-mounted solar PV projects. The Government of Maldives plans to launch the Request for Proposal for the subprojects totaling 21 MW in Q2 2021. Preparatory works for the remaining 15MW of subprojects are ongoing. The bidding package will be prepared by PMU with a feasibility study including specific site and technology requirements. An indicative pipeline of IPPs to be supported under the project is set out in Table 1.

Table 1: Indicative IPP Pipeline

Seq.	Scale/Type	Location	Indicative CAPEX	Current Status
1	11 MW ground-mounted solar PV	Addu City[6], Fuvahmulah City, GDh. Thinadhoo, B. Eydhafushi, Lh. Hinnavaru, and HDh. Kulhudhufushi	USD11 million	Prequalification document launched, Request for Proposal expected in Q2 2021
2	10 MW floating solar PV	Addu City	USD15 million	Prequalification document launched, Request for Proposal expected in Q2 2021
3	8 MW ground-mounted solar PV	Lh. Naifaru, Dh. Kudahuvadhoo, L. Isdhoo, L. Isdhoo, L. Kalaidhoo, L. Dhan'bidhoo, L. Maabaidhoo, L. Mundoo, L. Gan, L. Fonadhoo, L. Maavah, L. Maamendhoo, L. Hithadhoo, L. Kunahandhoo	USD8 million	Under development
4	7 MW solar PV[7]	Greater Malé Area and other possible islands	USD11 million	Under identification
Total	**About 36 MW**		**USD45 million**	

Source: World Bank.

21. **Component 2. Battery Energy Storage Systems (BESS) (USD23 million CTF concessional loan).** This component will support the deployment of BESS in Addu City and other islands to enable a higher penetration of solar PV in the power system while also ensuring reliable supply in a cost-efficient manner. The component would support approximately 50 MWh of BESS in the selected grid systems, subject to market price trends. The CTF loan will be provided to the government to procure and operate the BESS. The BESS will be procured based on a design, build and transfer model.

22. **Component 3**. **Grid Modernization for VRE Integration (USD20 million AIIB loan and USD6.2 million IDA credit)[8].** AIIB loan will be financing component 3. This component will support grid modernization, upgrades and reinforcement to accommodate an increasing volume of VRE and BESS in selected grid systems. The primary scope of component 3 will include

[6] 2MW ground-mounted applications in Hithadhoo and Feydoo, and 2MW ground-mounted application in HulhudMeedoo

[7] Site identification is ongoing for subproject 4.

[8] The project will be one of the first projects under the Global Battery Storage Program, to which the World Bank has committed USD1 billion and is mobilizing an additional USD1 billion in concessional climate finance from various partners.

strengthening network capacity; deploying supervisory control and data acquisition (or SCADA) systems[9] and optimizing interactions among renewable energy generation, BESS and existing conventional power plants. Further, this will include rehabilitation and/or upgrades of grid infrastructure such as transformers, switchgear, distribution boxes, control panels and any other grid upgrades related to power house and distribution network, which may include electrical and civil works. However, such will not cover diesel-generating units. The interconnection among islands will be also considered to improve system balancing and flexibility. The total length of the electrical transmission and distribution lines to be constructed and/or rehabilitated under the project is 140 kilometers, of which most lines are passing through the land-connected areas between islands. Additional financing of EUR20 million from Casa Depositi e Prestiti (CDP) is in early discussions with the Ministry of Environment for component 3. Subject to detailed assessment under component 4 - Technical Assistance (TA) activities, CDP financing may support extended grid upgrades.[10]

23. **Component 4. Technical Assistance (USD3 million CTF grant).** This component will provide TA support for investments in components 1, 2 and 3 to be implemented by the Ministry of Environment through its PMU. This component will support the institutional capacity building of the Ministry of Environment, STELCO, FENAKA and other relevant stakeholders for planning, implementing, operating and monitoring power systems that can absorb increasing amounts of VRE. This component will also support pipeline development with feasibility studies, preparation of safeguard instruments and technical advisory for the tendering process. It will also support TA work in other sustainable energy development, including offshore wind, electric vehicles, vehicle-to-grid technologies, green hydrogen for energy storage and transportation and energy efficiency. Finally, it will help the Ministry of Environment implement several gender assessments to address gender gaps identified in the ministry's Gender Action Plan.

D. Cost and Financing Plan

Table 2: Project Cost and Financing Plan

Item	Financing (USD million and %)					
	AIIB	**IDA**	**CTF**	**Private Sector**	**TOTAL**	**%**
Baseline Costs						
Component 1*		6.2	4.0	45.0	**55.2**	**51.4**
Component 2			23.0		**23.0**	**21.4**
Component 3	20.0	6.2			**26.2**	**24.4**
Component 4			3.0		**3.0**	**2.8**
Total	**20.0**	**12.4**	**30.0**	**45.0**	**107.4**	**100**

[9] The deployment of SCADA systems and all critical grid upgrades will be prioritized by the Ministry of Environment and the utilities, supported by the owner's engineer consultant.

[10] CDP financing may also support associated infrastructure for electric mobility to induce a gradual shift from fossil fuel-based transport modes to ride-sharing services and associated electric vehicle charging infrastructure.

* For Component 1, MIGA guarantee of USD40 million will be provided to IPPs. Private IPPs will also benefit from the tariff buydown and escrow facility included in Component 1.

24. **Cofinancing Arrangement**. Component 3 of the project will be cofinanced by AIIB and World Bank. World Bank will provide procurement, environmental and social, financial management, disbursements, project monitoring and reporting services for the project on behalf of AIIB. As permitted by AIIB's environmental and social and procurement policies, World Bank's policies and procedures on environmental and social aspects and procurement, disbursement, financial management, project monitoring and reporting will be used for the project (including activities to be financed by AIIB and the CTF administered by World Bank), as they are materially consistent with AIIB's corresponding policies. AIIB will provide adequate support to project implementation according to a co-lender's agreement between AIIB and World Bank.

25. **Financing Terms**. The AIIB loan tenor will be 31 years, including a grace period of seven years, at AIIB's standard interest rate for sovereign-backed fixed spread loans.

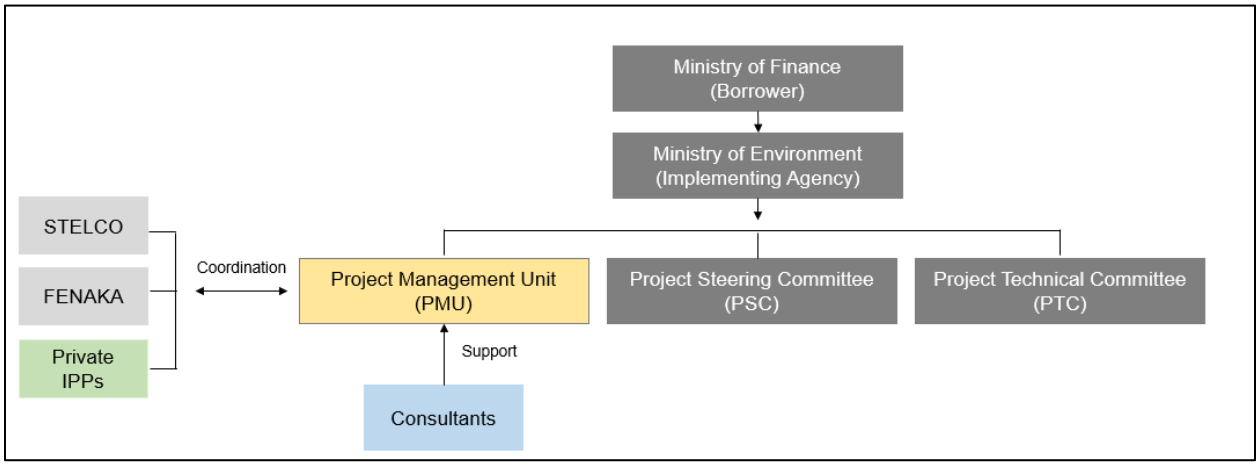
26. **Concessionality of the Financing Package**. The proposed financing package (AIIB loan combined with other grants and concessional financing) meets the concessionality requirements applicable to Maldives, as the grant element[11] of the proposed financing package exceeds the qualifier threshold. The Non-concessional Borrowing Policy has been replaced by Sustainable Development Finance Policy (SDFP), effective starting July 1, 2020. AIIB project team has confirmed with the World Bank team that the financing package still meets the requirements under the new SDFP.

E. Implementation Arrangements

27. **Implementation Period.** The project is expected to be implemented from January 2021 to Jan. 31, 2026.

[11] As adopted by the Executive Boards of the International Monetary Fund and the World Bank in 2013, the methodology assumes a single, fixed, unified discount rate of five percent to assess the grant element of individual loans (calculated based only on the USD value of the loan). Whenever the interest rate charged for a loan is lower than the discount rate, the difference in present value of the debt and its face value reflects the positive grant element of the loan. The grant element of the total financing package is calculated as the weighted average of the grant elements of each loan or grant, which is calculated as the difference between the face value and the sum of present value of debt service, expressed as a percentage of the face value of the loan.

Figure 1: Project Implementation and Monitoring Structure



28. **Implementation Management.** As illustrated in Figure 1, the Ministry of Environment will be the implementing agency for the project to provide oversight on the implementation of all components; the ministry's previous experience in working with MDBs will assist in implementing and coordinating activities. The existing PMU under the Ministry of Environment will be restructured for the implementation of the project, and the ministry will submit the restructuring plan for the PMU to AIIB and World Bank for review.

29. Under component 1, the PMU, with support from World Bank, will lead the preparation and implementation of the competitive bidding process to select IPPs for the solar power subprojects listed in Table 1. The escrow portion of component 1 will be managed through a commercial bank (escrow bank) appointed to handle the account and calls on it, as well as replenishments required from the utility or the Government of Maldives. Components 2, 3 and 4 will be directly managed through the PMU under the Ministry of Environment. The ministry will lead the implementation of component 3 in close coordination with STELCO and FENAKA.

30. The IPP subprojects to be supported under component 1 will be implemented by the private sector entities that will have overall responsibility for designing, financing, constructing and operating solar power generation facilities for the duration of their respective PPAs. The PPAs between private IPPs and off-takers will lay out in detail the responsibility of each party.

31. For component 1, assets installed under PPAs will be handed over to the respective utility, either STELCO or FENAKA (or its successor), upon expiration of the PPA, in accordance with the terms of PPA. The International Finance Corporation may offer loan financing to the upcoming bids under component 1 subject to its internal approval. For component 2, the Ministry of Environment, through its PMU, will lead a procurement process for the BESS through a competitive bidding procedure. Different options on operation and maintenance (O&M) arrangement will be explored during the preparation of tendering to ensure efficient operations. Other assets acquired through engineering, procurement and construction (EPC) contracts under components 2 and 3 will be transferred to the respective utility, upon completion of defects liability

(or O&M) period, in accordance with any relevant government policies, agreements and/or guidelines set by the Ministry of Finance and the Ministry of Environment. Given the scope of work that is closely related to grid systems, the Ministry of Environment will ensure close coordination with STELCO and FENAKA throughout implementation.

32. **Project Steering Committee**. PMU has established a Project Steering Committee (PSC), composed of the Ministry of Environment, STELCO, FENAKA and any other relevant parties. PMU will serve as the secretariat of the PSC, and one representative from each organization will be participating as permanent members in the PSC meetings held at least twice a year. PSC will provide strategic guidance, high-level oversight, periodic implementation progress review and key project implementation decisions. The yearly work plan and budget compiled by PMU will be endorsed by PSC.

33. **Project Technical Committee.** In addition to the PSC, a Project Technical Committee (PTC) has been established to discuss technical issues related to grid, solar PV and BESS, and tasked with quick resolution of issues that arise during project implementation. The PTC will comprise of technical staff within the PMU and the Ministry of Environment, technical staff of STELCO and FENAKA and the Maldives Energy Authority. The meetings of the PTC will be held at least every quarter, and the PMU will be the secretariat for the PTC.

34. **Owner's Engineer Consultant**. The Ministry of Environment has procured the services of a consulting firm that will support the project, specifically the "Owner's Engineer for Planning, Designing, and Supervision of Utility-scale Battery Energy Storage Systems (BESS), Energy Management System (EMS) and Complementary Grid-Upgradation." The consultant scope of work has been reviewed and is considered satisfactory to AIIB and World Bank.

35. **AIIB's Implementation Support.** World Bank will lead the supervision of all components of the project as the lead cofinancier, in accordance with its applicable policies and procedures and a Project Co-Lenders' Agreement to be signed between AIIB and World Bank. AIIB will conduct joint supervision missions with the World Bank team twice a year, or more frequently as needed, to ensure the implementation progress is satisfactory to AIIB. During the COVID-19 pandemic, supervision missions may be carried out virtually via videoconferencing. AIIB and World Bank will carry out a midterm review mission to assess whether the intermediate outputs are still likely to be achieved under the project and if any changes to the project may be required.

36. **Monitoring and Evaluation.** Monitoring and evaluation, and implementation support will be directly managed and coordinated through the PMU. Monitoring and evaluation will be directly linked to the outcome indicators defined in the Results Monitoring Framework outlined in Annex 1. The PMU under the Ministry of Environment will prepare semiannual progress reports as well as more detailed annual reports for the government, AIIB and World Bank that provide updates on monitoring and evaluation procedures, implementation, budgets and compliance with procurement, disbursement, financial management as well as environmental and social standard. The PMU will also submit to AIIB a quarterly Interim Unaudited Financial Report (IUFR) and annual audited financial statements and such other information as AIIB may reasonably require.

Approximately three years after effectiveness, the PMU will carry out a thorough midterm review of project implementation and report their findings and conclusions to AIIB and World Bank.

37. **Procurement.** The PMU under the Ministry of Environment will be responsible for procurement under the project. World Bank being the lead financier, procurement under the project will follow World Bank Procurement Regulations for IPF Borrowers - (Procurement in Investment Project Financing- Goods, Works, Non-Consulting and Consulting Services, July 2016 (Revised November 2017 and August 2018). All high-value, high-risk procurement packages are proposed to be conducted through International Open Competitive Tendering method. The PMU will also be supported by international consultants for major procurement in terms of procurement planning, contractor/consultant selection and contract award under the project.

38. **Financial Management.** The existing PMU under the Ministry of Environment for the ASPIRE project (previous World Bank project) shall continue to function as the PMU for the project. The planning, budgeting, funds flow, accounting, reporting, internal controls and audit arrangements shall be aligned with the government's system. The PMU shall prepare annual work plan and budget as per procurement plan and financing agreement. The PMU is staffed with a project director, financial management specialist and procurement specialist. However, with the addition of the project and increased workload, the PMU shall procure additional financial management staff.

39. The PMU shall prepare and submit IUFRs to AIIB and World Bank within 45 days of end of each quarter. The project financial statements shall be prepared by the PMU and shall be audited annually by the Auditor General's Office of Maldives, which is acceptable to AIIB and World Bank. The annual audited project financial statement shall be submitted to AIIB and World Bank within six months after the end of each fiscal year.

40. The project shall follow report-based disbursement mechanism and advances shall be deposited to a Designated Account (DA) set up with the Maldives Monetary Authority. AIIB shall advance an amount to DA to meet the estimated expenditures for the six-month period, as forecasted in the IUFRs. The loan shall also allow AIIB's standard disbursement methods, such as: (1) payments against Special Commitments, (2) reimbursement of eligible expenditures and (3) direct payments. The Disbursement and Financial Information Letter shall detail out the authorized signatories, DA conditionalities, process of submitting claims and other terms and conditions of disbursements related to the project.

3. Project Assessment

A. Technical

41. **Overview**. The proposed project's design has been developed based on a technical assessment conducted during project preparation specifically considering the deployment of BESS and floating solar PV in a developing country context. Solar power is commercially viable, technically proven and competes with conventional electricity generation technologies in a number of markets. BESS has only been widely deployed as a grid asset and service provider in some advanced economies including the United States, the United Kingdom, South Korea and Australia, and is starting to pick up in developing Asian economies such as China, India and the Philippines.

42. There has been limited experience in deploying solar power projects and BESS in Maldives to date. To this end, World Bank financed the "Energy Storage Roadmap for Maldives"[12] with support from the World Bank's Energy Sector Management Assistance Program (ESMAP) to assess the techno-economic feasibility of enabling solar PV and battery storage in Maldives. The study finds that in the selected five islands there is potential to integrate approximately 30 MW of solar PV by deploying battery storage with approximately 100 MWh capacity. The study makes it clear that deploying BESS and grid investments will be essential to integrating a higher share of solar PV into the island grid systems. The study recommends that implementing new technologies like floating solar PV systems will help Maldives mitigate the scarcity of suitable land and rooftop space, and substantially increase renewable energy penetration. The study finds that BESS paired with solar PV can substantially reduce power costs across islands, especially where BESS can enable integration of additional solar PV generation.

43. In the context of Maldives, BESS is required to provide frequency and voltage regulation, grid ancillary services, facilitate integration VRE through energy shifting and effectively replace diesel generation capacity at peak hours. To serve this purpose, a longer duration BESS that covers two to four hours of energy storage needs to be introduced. The Energy Storage Roadmap for Maldives study recommends that a four-hour lithium-ion battery will be the primary storage technology installed in Maldives.

44. Floating solar PV forms part of the pipeline of IPP projects envisioned under component 1 and is an integral part of the project that can help address the land availability issue. Maldives has experience in deploying small-scale floating solar PV solutions in several resort islands and inhabitant islands. In preparation for the proposed project, the Ministry of Environment has conducted a rapid Environmental Social Assessment across three identified floating solar sites in Addu City. The results from the ESA have indicated that the three selected sites are conducive for the proposed floating solar subprojects. ESMAP is also currently supporting a prefeasibility

[12] World Bank. 2019. Energy Storage Roadmap for the Maldives - Executive Summary. http://documents.worldbank.org/curated/en/340311572621106332/pdf/Executive-Summary.pdf.

assessment of floating solar PV in Maldives, which will further inform the competitive tendering of floating solar PV during project implementation. In addition, part of the TA funding under component 4 has been earmarked for specific consultancy projects on floating solar PV, and the Terms of Reference for the consultant has been discussed with World Bank.

45. **Project Design.** The Government of Maldives has experience with solar PV technology and competitive tendering from the previous ADB and World Bank projects, including the ASPIRE project. BESS has been deployed in the country at smaller scale under the ADB-funded POISED project mainly for frequency regulation. However, the project will introduce large-scale BESS in the power system, which may have a greater impact on system operation and reliability. As such, trainings will be provided under component 4 to enhance capacity at the Ministry of Environment, STELCO and FENAKA, and increase technical knowledge regarding BESS and floating solar applications.

46. **IPP Business Model.** The AIIB and World Bank team assessed the adequacy of adopting the IPP model to achieve project objectives and finds it satisfactory. Recent IPP bids in Greater Male area with STELCO as an off-taker (supported by the World Bank-funded ASPIRE project) have demonstrated that the electricity from solar PV IPPs can be purchased at as low as 10.9 US cents/kWh without battery, which is the lowest achieved among small island developing state nations. In comparison, with the most efficient technology for diesel, diesel power costs can range from 19 US cents/kWh to 33 US cents/kWh in Maldives[13]. With the World Bank-financed ASPIRE project, the IPP model was piloted for the first time in Maldives, for which over 16 private sector developers have responded to the prequalification notice and proved the feasibility of leveraging private sector investments and IPP model in Maldives. Further, for the proposed project, for the 21MW tender, a total of 58 applications were received for prequalification, an indication of strong interests from private investors.

47. World Bank's internal assessment also indicates that the PMU and World Bank team have accumulated sufficient learning to date with previous operations to adequately prepare and implement the proposed project based on the IPP model. It is also worthwhile to note that the selection of the IPP model is an extension of a broader World Bank engagement with the Government of Maldives. With a series of Development Policy Operations, World Bank is supporting the government in reducing its dependence on fuel and enhancing the fiscal sustainability of the country's energy sector, by supporting the revision of tariff-setting methodologies and structures, and relevant policy and regulatory frameworks.

48. **Integrated Operation of Project Components.** As the project scope includes multiple components including the solar PV, BESS and grid upgrades to be procured or implemented individually, AIIB team and World Bank team are working with the Ministry of Environment and the two utilities to ensure that all components are aligned and enable optimal system performance. To this end, World Bank, through the Ministry of Environment, has advertised and procured a

[13] The average tariff taking the fuel subsidy cost into account.

consulting firm that will support the project “Owner’s Engineer for Planning, Designing, and Supervision of Utility-scale Battery Energy Storage Systems (BESS), Energy Management System (EMS) and Complementary Grid-Upgradation.” The AIIB team has reviewed the Terms of Reference for the consultancy’s scope of work, which includes development of optimal configurations of BESS to integrate the planned solar PV into the power system of each island’s grid. The scope also includes identifying grid upgrade and reinforcement requirements for integrating the planned solar PV in consultation with FENAKA, and developing detailed engineering designs and technical specifications for BESS and grid upgrades.

49. **Operational Sustainability.** The proposed project will incentivize regional and global solar PV and storage developers and operators to come to Maldives with transparent bidding under globally accepted bankable project agreements and a robust security package. It will also place emphasis on environmental sustainability of BESS by requiring extended representations and warranties from BESS suppliers regarding decommissioning, recycling and disposal. Operation and maintenance (O&M) of BESS may pose some challenges for STELCO/FENAKA due to their limited experience in operating longer-term BESS. This is mitigated by exploring different O&M arrangements during the preparation of tendering to ensure that BESS functions as intended and that the utilities are equipped with sufficient O&M capacity. The utilities will own the BESS, and the BESS contractors will be required to provide O&M training as part of the contract.

50. As per market practice, there will be requirements for IPPs and suppliers of solar PV and BESS equipment to have local satellite offices staffed with a small team to better coordinate on the project. Further, the TA under component 4 will support the government to develop a policy framework and build local capacity in BESS and battery management. The integrated project design encompassing investments in generation, BESS, grid upgrade and capacity building will ensure that long-term sustainability is achieved for the project and future solar energy investments in Maldives, in general. Suitable management and operational capacity will also develop locally over time with the project.

51. **Implementation Readiness and COVID-19.** The implementation readiness for the project is high. The PMU has already been established and is fully staffed. The first two subprojects totaling 21MW are at an advanced stage of procurement, and the preparatory works for the remaining 15 MW is ongoing. Components 2 and 3 are planned to be implemented in parallel with component 1, with the prequalification for the first procurement package of BESS and grid upgrades expected to be launched in Q2 2021. For component 3, the utilities have submitted the indicative pipeline of grid upgrade investments, which is under verification and being prioritized by the Government of Maldives. Further, adoption of the Project Operations Manual will be defined as a key covenant to the AIIB loan agreement. The project team has further assessed the potential impact of the recent COVID-19 pandemic on the project, including on the financial viability, increased fiscal instability of the borrower, and potential delays in project implementation.

52. **Project Financial Viability**. Along with the rest of the world, the economy of Maldives economy has suffered severe adverse impact from COVID-19, as the pandemic wreaked havoc on its tourism industry. Cumulatively, the 65 percent year-on-year fall in tourist arrivals from February to May 2020 exceeds the decline in tourist arrivals experienced in the four months after the 2004 tsunami. Global and domestic containment measures as well as reduced demand have significantly affected the country's economic activities, which could subsequently impact the demand for electricity and the project's financial viability. Despite historically low oil prices, financial difficulties in the power sector could worsen with a decrease in demand as well as the bill collection rates. Accordingly, the Government of Maldives has subsidized 40 percent of the electricity price as part of the COVID-19 pandemic recovery support.

53. Overall, in the short to medium term, the electricity demand could be negatively impacted. However, in the long term, the project makes more economic sense for the state utilities, as the substitution of diesel with solar power for electricity generation would result in significant generation cost savings. The COVID-19 pandemic further reveals the urgent need for Maldives to scale up private investments in renewable energy. Although the recent drop in global oil price has alleviated some pressure on the government's fiscal accounts, reducing the generation cost with renewable energy remains ever more important as many firms and households are suffering due to high utility bills[14]. As per annual report of the Maldives Monetary Authority, the magnitude of the pass-through of low or high oil prices to domestic consumer electricity prices has been small. The Ministry of Environment has also confirmed that the lower oil prices help the government reduce its overall subsidies to the electricity sector, but does not translate to lower electricity tariffs. The project is expected to help the two utilities lower their average generation costs and revisit Maldives' electricity generation model, thereby strengthening the country's resilience to oil price fluctuations in the long term.

54. Further, the short- to medium-term adverse impact of COVID-19 on electricity demand and on the project is expected to reverse its course in 2021 as Maldives reopens its border. Although the duration of the short-term impact is unknown, tourist arrivals are expected to resume relatively quickly given that the tourism infrastructure and the capacity of the economy to receive tourists stays intact, as compared to after the 2004 tsunami. The government plans to leverage investments in economic infrastructure such as the international airport in Valena and the maritime port in Male, to help in the recovery of the tourism sector. In addition to proactive containment measures, the government has reopened its borders for international tourists in phases starting July 15, 2020. World Bank projects a slow but steady recovery for Maldives, with GDP growth in 2021 from 7.9 percent to 8.5 percent as tourism resumes.[15] The impacts of COVID-19 on the financial performance of the two utilities are expected to also reverse course with the economic recovery (see Financial Analysis of Off-takers). AIIB team in coordination with World Bank team will continue to monitor electricity demand risks for the project.

[14] World Bank. 2020. Maldives Development Update – in Stormy Seas.
[15] Ibid.

55. **Macroeconomic Stability**. According to the International Monetary Fund (IMF), Maldives' GDP growth is expected to be at around negative 8.1 percent in 2020, a significant decrease compared to the pre-pandemic growth rate of 5.7 percent in 2019.[16] The fiscal impact is also expected to be significant due to reduced revenues from tourism and health expenses related to COVID-19. Overall fiscal deficit is projected at 27.5 percent of GDP in 2020. The Government of Maldives has responded quickly to alleviate the impact of the pandemic on its debt sustainability. Its revenues are expected to be 49 percent lower than the revenue projected in the approved 2020 budget; however, proactive measures have been taken to reduce the expenditure from the approved level of USD2.3 billion to USD2.0 billion, by 21 percent. The measures include freeze hiring across the government, reduction of personal emoluments for political appointees and government employees with basic salary over MVR20,000 (USD1,298) per month and reduction in allocations for transportation, repairs, and operational and administrative services.[17] Additional savings are expected from reduced subsidies due to declining global oil prices. Efforts have also been made by the Government of Maldives to improve its debt transparency. Regular government publications include semiannual debt bulletins and debt statistics, and a second Debt Management and Performance Assessment was conducted upon the government's request in 2020.

56. IMF positively evaluates the government's commitments to ensure fiscal and debt sustainability with reduced capital spending, recurrent expenditure discipline and revenue mobilization. In its press release, IMF has noted that the government will reprioritize and cut capital expenditures and redirect funds to pandemic response, while maintaining high standards of transparency and governance. Acknowledging the government's commitment to fiscal sustainability, IMF has also approved USD28.9 million of Rapid Credit Facility[18] to help Maldives cover its balance of payment needs and fiscal needs during COVID-19. Additional support from other international financial institutions is also expected during the pandemic. Annex 3 provides further detail on the Debt Sustainability Analysis for Maldives.

57. **Implementation Timeline during COVID-19.** The potential impact of COVID-19 on the planned timeline is considered limited. There may be slight delays in terms of onsite assessments; however, the Ministry of Environment has confirmed that the overall impact of COVID-19 on the implementation timeline would be minimal. The Owner's Engineer consultant will also support the Ministry of Environment to expedite the process and prevent any delays in implementation.

B. Economic and Financial Analysis

58. **Economic Analysis.** Economic analysis has been carried out by World Bank for a model investment of 10 MW of solar PV and 8.4 MW/33.6 MWh of BESS in Addu. Addu City has been

[16] IMF. 2020. Maldives: Request for Disbursement under the Rapid Credit Facility – Press Release; Staff Report; and Statement by the Executive Director for Maldives. 23 April.
[17] Ministry of Finance. 2020. Presentation on COVID-19 & the Maldives. 11 June.
[18] The Rapid Credit Facility provides concessional financial assistance to low-income countries facing balance of payments need without ex-post conditionality. Financing under the credit facility carries a zero interest rate, provided as a one-off loan disbursement.

selected as a model for the economic analysis, as it is one of the largest outer islands in Maldives, and 14 MW out of total 36 MW solar PV planned under the project will be installed in Addu City. The purpose of the analysis is to demonstrate the economic feasibility of a general investment case in solar PV generation capacity and VRE integration, which will likely be replicated in other islands. The island grid system in Addu currently has 14.25 MW of installed diesel generation capacity and 1.6 MW of solar PV. Adding another 10 MW of solar PV will require additional investment in the grid system to integrate further VRE capacity.

59. **Economic Analysis Results**. This investment case is projected to be economically viable despite the large upfront capital expenditure cost of USD32.8 million for solar PV, BESS and grid modernization. The estimated economic internal rate of return (EIRR) is 8.7 percent before considering the expected reduction in greenhouse gas (GHG) emissions compared to the counterfactual scenario. This EIRR is higher than the discount rate of 7.2 percent for Maldives.[19] The economic net present value (ENPV) in this case is projected to be USD3.7 million. The positive economic feasibility is mainly from savings of diesel consumption, estimated at over 4.3 million liters per year. The proposed investments under the proposed project will also reduce cumulative GHG emissions by about 186,400 metric tons of CO_2 equivalent from 2021 to 2040. Once this is taken into account, the EIRR increases to 10.5 percent, and the ENPV is projected to be USD8.4 million, considering the low values of the shadow price of carbon.[20] Four sensitivity tests were conducted for the following scenarios: (a) 10 percent /20 percent decrease in market diesel price and (b) one-year/two-year delay in benefits. All scenarios yielded EIRR of above or equal to eight percent, including the expected reduction in GHG emissions.

60. Further, once the result of the Addu model analysis is applied to estimate the project-level impact on fiscal sustainability, the project is expected to reduce diesel consumption by about 15.6 million liters per year. Abstracting from general equilibrium and indirect effects, this will directly and positively affect macroeconomic aggregates for the country. The proposed project would reduce Maldives' import bill by about USD8 million annually. If the potential reduction is compared to macroeconomic estimates for the year 2021 and 2022, it would reduce the current account deficit in 2021 and 2022 by -0.15 percentage points of GDP. Further, based on World Bank Commodity Price Outlook, the government would reduce annual fuel subsidies by USD2.6 million in the year of 2021, assuming the project delivers a total of 36 MW of solar PV. This would reduce fiscal deficit in the country by a nominal 0.03 percentage points of GDP over the baseline projected fiscal deficit level.[21]

[19] Based on the World Bank's guidance note issued in May 2016 on "Discounting Costs and Benefits in Economic Analysis of World Bank Projects," the discount rate is twice the expected long-term per capita growth rate of the country. An average per capita real GDP growth rate of about 3.6 percent is expected from 2020 to 2022, based on World Bank estimates. The discount rates used for previous World Bank projects ranged from 5.0 percent to 9.0 percent.
[20] World Bank. 2017. Guidance Note on Shadow Price of Carbon in Economic Analysis. In line with the High-Level Commission on Carbon Prices, this analysis uses a low estimate of the carbon price starting at USD40 in 2020 and increasing to USD50 by 2030.
[21] World Bank staff internal calculation.

61. **Financial Analysis.** The financial analysis has been conducted for the Addu model investment. The following investment cases are analyzed below: (1) from the perspective of an IPP investing in solar PV under a PPA commercial arrangement, and (2) from the perspective of the Ministry of Environment and FENAKA on signing the same solar PPA and investing in BESS and grid modernization with both concessional and commercial financing.

62. **Financial Analysis Results**. The analysis shows that in the first scenario, IPP investment in solar PV in the Maldives is financially feasible. This scenario considers an upfront capital cost of USD13 million with a mix of floating solar PV and ground-mounted solar PV, and a PPA tariff of 13 US cents/kWh.[22] The internal rate of return to equity holders after debt service is estimated at approximately 15.6 percent, which is on par with the current rate of return on equity (15 percent) required by the market for investments in Maldives.

63. In the second scenario, the analysis shows that it is financially viable for FENAKA to invest in BESS and VRE integration, and purchase electricity from an IPP. In this scenario, considering the market fuel price of MVR11.19 (USD0.7262) per liter, the financial internal rate of return (FIRR) for FENAKA is projected to be 13.3 percent. Considering World Bank's hurdle rate of 10 percent, the financial net present value is approximately USD2.7 million. However, FENAKA purchases diesel at a lower cost due to the fuel subsidy paid by the government to the State Trading Organization (STO). If the subsidized fuel price is applied in the analysis, the FIRR would decrease to three percent. As such, the analysis reveals that the government would likely need to consider revisiting its subsidy scheme to align incentives and promote renewable energy development.

64. **Financial Analysis of Off-Takers**. A financial analysis on the off-takers (Annex 2) has been undertaken by the World Bank team in light of the potential impact of COVID-19 on the financial performance of the off-takers. For the projection of the two off-takers' financials, the analysis considers the contractions to the economy of Maldives due to COVID-19 as per World Bank projections as well as the fluctuations in global oil prices. The analysis is based on FENAKA's 2016, 2017, 2018 and 2019 financial statements, and STELCO's 2016, 2017, 2018 and 2019 audited financial statements.[23] In the short term, the two utilities are expected to experience significant reductions in their revenues, which will have to be financed by the government through capital injections or subsidies. However, the revenue reductions are expected to be temporary and will reverse their course. As per World Bank analysis, the revenues of the two utilities are expected to start recovering in 2021 and return to pre-COVID-19 level around 2022. Most importantly, the project provides critical investments for the two utilities that help lower their generation costs going forward, especially during the time when public finances in Maldives are limited to meet such investment needs. More details are provided in Annex 2.

65. **STELCO**. STELCO's revenues have grown steadily over the past four years with its operating expenditures kept under control. Its operating performance has been stable with its earnings before interests, taxes, depreciation and amortization (EBITDA) margin at 14 percent, 15

[22] Based on solar PV only, excluding BESS.
[23] 2019 financial statements for FENAKA are unaudited.

percent and 16 percent in 2017 to 2019. Over the last few years, the company has made large long-term borrowings to invest in new electricity generation capacity, which doubled its debt from 2016 to 2019. Because of the COVID-19 pandemic, STELCO's revenues are expected to decline by 27 percent cumulatively in 2020, and its net income to decline by USD40 million, as compared to the business-as-usual scenario. However, STELCO is expected to recover and start breaking even in 2021 and post consistently rising profits each year. Apart from the working capital issues from reduced collections in 2020, STELCO is not expected to require large subsidies to cover any operating shortfalls, but it may require government support to finance its capital expenditures program through capital injections, subsidies or grant.

66. **FENAKA**. FENAKA's revenues have decreased or stagnated since 2016, and it has posted operational losses over the last three years. Its profitability deteriorated in 2018 and 2019, when losses before Government of Maldives subsidies reached -46 percent and -47 percent of revenues, respectively. In 2019, operating expenditures represented 132 percent of revenues, of which 75 percent is diesel costs. To sustain its operations, the government had provided usage subsidies for revenue losses due to reductions of retail tariffs driven by government, as well as equity grants to finance its grid infrastructure. FENAKA has limited room to increase its revenues given its high price of electricity at 23 to 33 US cents/kWh. With the expected reduction in tourism industry and the economy, in general, FENAKA's revenues are expected to take a dip in 2020 and start recovering in 2021; however, pre-COVID-19 revenues are only expected to be achieved in 2022.

67. The proposed project will help STELCO and FENAKA lower their generation costs going forward. The combination of solar PV and BESS would replace 2.2 MW (in case of STELCO) and 10 MW (in case of FENAKA) of diesel generation that would have to be installed otherwise, resulting in the migration of 2.8 percent and 18.2 percent of their electricity demand, respectively, to solar in 2021. Because of the low solar costs at 1.69 MVR/kWh (10.97 US cents/kWh) as opposed to the cost at 23 US cents/kWh for most efficient diesel-based generation, (1) for STELCO, diesel consumption will be reduced by 3.3 million liters in 2021 and the direct costs of power generation will be reduced by MVR5.7 million (USD0.4 million); and (2) for FENAKA, diesel consumption will be reduced by 16.2 million liters in 2021 and direct costs of power generation will be reduced by MVR54.1 million (USD3.5 million). More details including projected income statements by STELCO and FENAKA and the impact of the project are presented in Annex 2.

68. **Impact of Oil Price Fluctuations**. The financial performance of the utilities would not be impacted heavily by shifts in the global oil price. Because the fuel subsidy is provided directly to STO, the utilities can purchase diesel fuel at the maximum baseline price if the market price is higher than the baseline. The cost of diesel fuel for the two utilities would not change unless the Government of Maldives changes the baseline price. With the plummeting global oil price, the fuel subsidy is projected to be reduced in the near term. STO frequently adjusts the price of diesel to pass through fluctuations in the global oil price, resulting in the domestic diesel price closely linked to the global oil price. As of September 2020, the global oil price is close to USD40 per barrel, while the domestic diesel price is currently MVR8.71 per liter. The subsidized price to the utilities remains lower at MVR7.6 per liter. World Bank projects global oil prices to be on average USD44 per barrel in 2020 and USD50 per barrel in 2021, which is still lower than the average price in 2019,

and therefore the reduced fuel subsidy to STO will provide relief to the fiscal burden on the government.

69. In parallel with the project, World Bank is engaging with Maldives through a series of Development Policy Operations to improve the policy framework that enhance sustainability of public finance. Through the Development Policy Operations, World Bank will support the Government of Maldives to revise the electricity tariff structure and improve cost recovery in the sector. In particular, the reforms include a trigger requiring the government to gazette a new electricity tariff structure to allow utilities to recover costs. These reforms are expected to contribute toward a reducing dependence on fuel as well as reducing the country's fiscal and external vulnerability to fluctuations in global oil prices. This is expected to result in a reduction in electricity subsidies, measured by a reduction in transfers to STO in terms of fuel subsidies and to state utilities in terms of tariff subsidy— in the medium term.

C. Fiduciary and Governance

70. **Procurement.** The World Bank Procurement Regulations for IPF Borrowers- (Procurement in Investment Project Financing- Goods, Works, Non-Consulting and Consulting Services, July 2016 (Revised November 2017 and August 2018) will be applied for all procurement under the project. World Bank's procurement regulations are materially consistent with the bank's core Procurement Principles set out in the Procurement Policy.

71. As per World Bank's assessment, the Ministry of Environment has several years of experience implementing World Bank-supported projects and is currently implementing multiple projects with World Bank and other donors. The ministry has experience in managing contracts involving medium- and large-sized projects, including those financed by ADB and World Bank. The implementing agency has prepared a draft Project Procurement Strategy for Development (PPSD), which describes procurement strategies and specific procurement issues in the country and at the institution level, and proposes measures to mitigate risks posed by these issues. AIIB has reviewed the PPSD and procurement plan, and is satisfied with the proposed procurement arrangements presented in the plan and the PPSD, which meet AIIB's Core Procurement Principles and Procurement Standards. World Bank has rated procurement risk as "substantial" based on implementation challenges specifically for procuring goods, works, non-consulting services and hiring of local consultants in other World Bank-financed projects in Maldives. For AIIB-financed procurement packages, the tenders are high-value but low-risk and hence, project procurement risk is categorized as medium. Implementation of the risk mitigation measures and procurement performance will be reviewed during implementation and procurement risk will be updated accordingly.

72. **Financial Management.** Based on the assessment, overall proposed project financial management arrangement is considered adequate and financial management risk as Medium. The Ministry of Environment is well versed in managing MDB-supported projects such as World Bank's operations, and is familiar with all required procedures and requirements related to financial management.

73. The PMU is already staffed with a finance/accounts specialist and it has been suggested for additional financial management staff due to addition of the project and increased workload. The project planning, budgeting, funds flow, accounting, reporting, internal controls and audit arrangements shall be aligned with the government's system. The PMU shall prepare an annual workplan based budgets and shall be prepared through a consultative process with the PSC. The PMU shall record and maintain project books of account in an off-the-shelf, acceptable and well-established accounting software like Quick Books or SAP, which is quite well-accepted in Maldives. The PMU shall maintain a fully integrated voucher-based computerized double-entry accounting system, incorporating ledgers, registers, books and cash-based-accounting. The project accounting records shall be maintained on cash basis, where all the receipts and expenditure shall be on cash basis. Due to multiple financing partners, the PMU shall maintain separate ledgers/modules and books of records through the computerized accounting system to track expenditure incurred from each source of financing, reporting and documenting such expenditures to AIIB and World Bank. All project expenditures inclusive of taxes and duties, as applicable, shall be recorded at the actual USD expenditure at the date of the payment.

74. The project shall be subject to a regular internal audit by the internal audit unit of the Ministry of Environment. The internal audit shall assess whether funds have been disbursed on a timely basis, reached the intended recipients and transactional controls and propriety have been maintained and used effectively and efficiently for the intended purposes. The internal audit reports shall be shared with AIIB and World Bank.

75. The PMU shall prepare and submit IUFRs to AIIB and World Bank within 45 days of end of each quarter. The project financial statements shall be prepared by the PMU and shall be audited annually by the Auditor General's Office of Maldives, which is acceptable to AIIB and World Bank. The annual audited project financial statement shall be submitted to AIIB and World Bank within six months after the end of each fiscal year.

76. **Disbursement.** The project shall follow report-based disbursement mechanism and advances shall be deposited to a Designated Account (DA) set up with the Maldives Monetary Authority. AIIB shall advance an amount to the DA to meet its share of the estimated expenditures for the six-month period, as forecasted in the IUFRs.

77. **Governance and Anti-corruption**. To the extent that the requirements stipulated in World Bank's Anti-Corruption Guidelines are consistent with AIIB's Policy on Prohibited Practices, World Bank's policy will apply, and to the extent it diverges from AIIB's policy, AIIB's policy will apply to all components with contracts financed in whole or in part by the proceeds of the proposed AIIB loan. Detailed requirements will be specified in the Loan Agreement and will also be included in the Co-Lender's Agreement.

78. **Institutional Capacity.** Limited capacity and weak coordination among government agencies and public utilities (particularly in the outer atolls) are key challenges in Maldives. To mitigate this risk, the team will field frequent visits to support the government in addressing

institutional capacity issues. This risk is also mitigated through institutional capacity-building activities under the technical assistance being provided under component 4 of the project.

D. Environmental and Social

79. **Applicable Environmental and Social Policy**. The project will be cofinanced with several cofinanciers, including World Bank, as lead cofinancier, and its environmental and social aspects are being assessed in accordance with the World Bank's Environmental and Social Framework (ESF). To ensure a harmonized approach to addressing environmental and social aspects of the project, and as permitted by AIIB's Environmental and Social Policy (ESP), the World Bank's ESF will apply to the project in lieu of AIIB's ESP; except that for component 1, World Bank's Performance Standards will apply to the project (in accordance with World Bank's OP 4.03).[24][25] AIIB has reviewed World Bank's ESF and Performance Standards and is satisfied that: (1) both are consistent with AIIB's Articles of Agreement and materially consistent with the provisions of AIIB's ESP and the relevant environmental and social standards; and (2) the monitoring procedures that are in place are appropriate for the project.

80. The Ministry of Environment has demonstrated its capacity to successfully implement World Bank safeguards and World Bank Group Environmental, Health and Safety (EHS) Guidelines for over a decade. Sector-specific environmental and social risks have also been successfully managed under the ASPIRE project. Additional capacity will be required to undertake the environmental and social due diligence required under the World Bank ESF and for BESS system management under component 3. In this regard, significant capacity building will be required at both STELCO and FENAKA. A PMU has been set up at the Ministry of Environment and includes as part of the designated personnel an environmental and social specialist who has five years of experience implementing World Bank safeguards policies and OP4.03 requirements.

81. **Categorization.** Under the World Bank ESF, World Bank has categorized the environmental and social risks of the project as Moderate, which is equivalent to Category B if AIIB's ESP were applied. An Environmental and Social Management Framework (ESMF), accompanied by an Environmental and Social Commitment Plan, a Stakeholder Engagement Plan, a Labor Management Procedure and a Gender Action Plan, has been prepared to meet the requirements of World Bank's ESF. For components 2 and 3, an Environmental and Social Impact Assessment and an Environmental and Social Management Plan will be prepared by the PMU, while the IPP will be responsible for component 1 activities.

82. **Environmental Aspects.** The proposed project activities will reduce fossil fuel-based energy generation dependency in Maldives. The energy storage systems and grid upgrading to the existing grid can provide environmental and social benefits through the improvements of

[24] Performance Standards for private sector
[25] World Bank Project Appraisal Document Paragraph 82. Use of OP 4.03 for component 1.

energy resilience and efficiency, and the increased use of clean electricity from renewable sources. The majority of the sites, including sites for land-based solar installation, BESS system installation, power houses and grid infrastructure, will be on inhabited islands and in areas where anthropogenic activities have already been conducted. Areas such as harbors, jetty areas and docks are being shortlisted as potential sites for the establishment of floating solar systems so that the subprojects are located away from environmentally sensitive locations.

83. Solar energy generation system investments are associated with moderate risks of adverse environmental impacts, such as future decommissioning of the solar energy systems at the end of their lifespan and grid upgrading. However, these impacts are expected to be localized in nature and arise only during construction such as dust/noise pollution and waste generation, as well as issues related to worker health and safety.

84. Installation of the proposed BESS units is not complex and will have a small installation footprint. However, the environmental risks associated with this activity will be moderate. Potential fire and explosion risks exist alongside the environmental hazards related to the disposal of used batteries containing hazardous waste. These risks will be mitigated with risk management measures, including product specifications and “cradle to grave” provisions in the contracts of supplier for batteries used in the BESS and solar cells, in accordance with International best practice.

85. **Climate Change Risks and Opportunities.** The project will contribute mainly to climate mitigation co-benefits by supporting electricity generation from variable renewable energy (VRE). By reducing consumption of diesel fuel in the energy sector across the Maldives islands, the project will contribute to managing air pollution and reducing particulate matter that is relatively higher around load centers.

86. **Social Aspects.** Project activities are not expected to result in involuntary resettlement as land/space needed for components 1 and 2 will utilize either existing government property or will be procured through lease agreements.[26] Component 3 will comprise small-scale civil works and technology upgrade within existing premises. The ESMF prepared for this project provides a screening process, which includes avoiding the need for involuntary resettlement as one of the criteria for project activities.[27]

87. WB’s assessment finds that there is no evidence suggesting the presence of Indigenous Peoples in the Maldives; therefore, Project activities will not have an impact on Indigenous Peoples. However, there may be cultural heritage sites on the inhabited islands. These sites are well known and demarcated and protected, thus reducing the risk of siting of any Project facilities near such sites. In addition, most Project activities are expected to be proposed in areas away from culturally sensitive areas. Nevertheless, the ESMF provides for a screening procedure to exclude activities

[26] Site visits have been conducted to all 21 MW islands and PV sites, and memorandum of understanding signed with site owners (island councils) and conditional approval from civil aviation for the two airport sites.
[27] Environmental and social screening for three out of the six 21 MW islands have been approved by World Bank.

situated in any cultural heritage sites (e.g. mosques, heritage sites or cultural sites, cemeteries). The Project will implement globally recognized practices for field-based study, documentation and protection of cultural heritage in connection with the Project, including by contractors and other third parties. A chance find procedure is a Project-specific procedure which will be followed if previously unknown cultural heritage is encountered during Project activities.

88. **Gender Aspects.** A significant gap in employment rates exists between men and women in the Maldives, particularly in the energy sector. One of the major reasons identified is underrepresentation of women in science, technology, engineering and math or STEM education programs and, more specifically, electrical and civil engineering. To address the gender gap, a Gender Action Plan has been prepared by the Ministry of Environment. Planned activities focus on increasing the pool of women that are ready for potential employment in the energy sector. The project will monitor the progress on these planned gender activities with the intermediate Results Indicators outlined in Annex 1.

89. **Occupational Health and Safety, Labor and Employment Conditions.** The various categories of workers hired for the anticipated civil works (as required) and the influx of "followers" will be subject to the requirements of relevant World Bank Environmental and Social Standards, including clear information on the terms and conditions of employment, principles regarding nondiscrimination and equal opportunity, establishment of workers' organizations, rules prohibiting child labor and forced labor and measures to ensure occupational health and safety at the worksite. Accordingly, a comprehensive Labor Management Procedure, in line with the requirements of World Bank ESF, has been prepared and disclosed. The procedure has also made provisions for a separate grievance mechanism for addressing labor issues, drawing on national laws and procedures. Further, to ensure health and safety of workers during the construction and operational phases of subprojects to be financed via the project, an Occupational Health and Safety plan, in line with the World Bank Group EHS Guidelines and Good International Industry Practice, has been prepared as an annex to the ESMF, in line with the nature of works expected via the project interventions. The Occupational Health and Safety plan in the ESMF will provide guidance in the preparation of subproject-specific occupational health and safety actions and plans.

90. **Stakeholder Engagement, Consultation and Information Disclosure.** Public consultations have been carried out with key project stakeholders and will be continued during project implementation. The Stakeholder Engagement Plan provides for consultations with stakeholders during the entire project cycle, procedures for disclosing information about the project, mechanisms for addressing and responding to grievances and reporting back to the stakeholders. The ESMF has also been disclosed on the client and World Bank websites.[28] The English versions

[28] World Bank. Environmental and Social Management Framework (ESMF) Accelerating Renewable Energy Integration and Sustainable Energy. https://documents.worldbank.org/en/publication/documents-reports/documentdetail/200651583931675434/environmental-and-social-management-framework-esmf-accelerating-renewable-energy-integration-and-sustainable-energy-p172788; Ministry of Environment, Republic of Maldives. ARISE Project Environmental and Social Safeguards Documents. https://www.environment.gov.mv/v2/en/download/10026.

of environmental and social documents, as well as English and Dhivehi versions of the executive summaries of the ESMF, are posted on the client, AIIB and World Bank websites.[29]

91. **Monitoring and Supervision.** World Bank will conduct regular monitoring and supervision of the project implementation. The reports of the supervision and monitoring conducted by World Bank will be shared with AIIB. AIIB will primarily conduct post-review and conduct joint site visits with World Bank, within the limitations of the travel restrictions. AIIB and World Bank environmental and social specialists will be working in close coordination and will share information on a periodic basis. AIIB will be able to provide inputs on corrective measures following the joint visits to project sites or by remote supervision of the project.

92. **Project Grievance Redress Mechanism.** A three-tier grievance redress mechanism is included in the Stakeholder Engagement Plan and referenced in the ESMF, which is based on the experience from previous energy projects implemented in the Maldives. Information on the grievance redress mechanism (is required to be displayed at the site, at the council, at the electricity service provider office and on the website of the Ministry of Environment, council and the electricity service provider.

93. **Independent Accountability Mechanism.** Pursuant to AIIB's agreement with WB, the WB's ESF will apply to this Project instead of AIIB's ESP. The WB's corporate Grievance Redress Service (GRS) and its Independent Accountability Mechanism, the Inspection Panel, which reviews the WB's compliance with its policies and procedures, will handle complaints relating to ES issues that may arise under the Project. In accordance with AIIB's Policy on the Project affected People's Mechanism (PPM), submissions to the PPM under this Project will not be eligible for consideration by the PPM.

E. Risks and Mitigation Measures

94. Based on the project description, the project's risk rating can be estimated as "Medium," with substantial risks in technical design and institutional capacity. The World Bank team has assigned "Substantial" risk rating to the project due to (1) macroeconomic risk, (2) technical design of the project, (3) institutional capacity for implementation and sustainability, and (4) fiduciary risks (procurement). Key risks foreseen at current stage and mitigation measures are summarized in Table 3.

Table 3: Summary of Risks and Mitigating Measures

[29] AIIB. Maldives: Solar Power Development and Energy Storage Solution. https://www.aiib.org/en/projects/details/2020/proposed/Maldives-Solar-Power-Development-and-Energy-Storage-Solution.html

Risk Description	Assessment Ratings (High, Medium, Low)	Mitigation Measures
Macroeconomic High risk of external debt distress; high current deficit and limited currency reserves; potential foreign currency convertibility issue; global downturn with COVID-19 pandemic	**High**	Project team to closely monitor the macroeconomic situation with the government during project implementation. The project itself as well as development partner financing including IMF Rapid Credit Facility support will help the Government of Maldives weather the risk.
Technical Design Introducing large-scale BESS in the Maldives can have an impact on system operation and reliability, despite the government's previous experience in PV and deploying smaller-scale BESS.	**Medium**	The BESS contractors will be required to provide O&M training to the Ministry of Environment as part of their contracts. Trainings to be provided under component 4 to enhance capacity of the Ministry of Environment, STELCO, and FENAKA, and increase technical knowledge regarding BESS and floating solar. A consultant to be hired will be responsible for evaluating the technical requirements of BESS to enable integration of generated electricity into the grid.
Institutional Capacity Limited capacity of government agencies and public utilities.	**Medium**	Institutional capacity-building activities to be provided under component 4 TA. In addition to AIIB and World Bank advisory, the Ministry of Environment will also be supported by international consultants.
Fiduciary The Ministry of Environment has extensive exposure implementing MDB-led projects. Procurement risk in terms of institutional capacity to handle the complexity and the magnitude of the proposed procurements.	**Medium**	The PMU has ample experience in implementing multiple World Bank-financed projects. The PMU to be supported by international consultants, Project Steering Committee and Project Technical Committees. Given the complexity and magnitude of procurements to be handled by the Ministry of Environment, the PMU will take the actions as suggested in the

Risk Description	Assessment Ratings (High, Medium, Low)	Mitigation Measures
		Project Procurement Strategy for Development (PPSD) and necessary measures will be introduced to ensure fiduciary responsibility.
Environment and Social Ensuring adequate implementation of ESMF	**Medium**	While the Ministry of Environment has demonstrated capacity to successfully implement World Bank ES safeguards and World Bank Group EHS Guidelines for over a decade, the ESMF identifies capacity development requirements for project staff, including the environmental and social officers of STELCO and FENAKA. The small land area of the Maldives coupled with the pristine coastal environment also present challenges in ensuring that adverse impacts are avoided, reduced and mitigated.
Implementation Potential risk of delay in the implementation of solar IPP projects. Challenges with installation of floating solar PV applications due to saline environment. Risk of higher cost of BESS than anticipated and/or poor performance of the battery.	**Medium**	The amount of the tariff buydown grant to be paid, in particular for floating solar PV applications, is linked with the performance of the IPP. Prefeasibility studies on floating solar PV are currently supported by World Bank's Energy Sector Management Assistance Program (ESMAP). The project is also supported under the World Bank's Global Battery Storage Program. The project will seek close coordination with the program including the Energy Storage Partnership where ESMAP is the global secretariat. The project will benefit from various partners of the program during implementation. In addition, consultants are being hired to support the PMU on procurement planning to ensure optimal performance of BESS.

Annex 1: Results Monitoring Framework

Project Objective:	To increase generation capacity from renewable energy sources and to facilitate the integration of renewable energy into Maldives' grid infrastructure.									
Indicator Name	**Unit of measure**	**Base-line**	**Cumulative Target Values**					**End Target**	**Freq-uency**	**Resp-onsibility**
			2021	**2022**	**2023**	**2024**	**2025**			
Project Objective Indicators:										
1. Renewable generation capacity installed under the project	MW	0.00	0.00	10.00	21.00	29.00	36.00	36.00	Annual	PMU
2. Private capital mobilized	USD million	0.00	0.00	10.00	26.00	34.00	45.00	45.00	Annual	PMU
3. Electrical transmission and distribution lines constructed (medium- and low-voltage) and/or rehabilitated	Km	0.00	0.00	30.00	70.00	100.00	100.00	140.00	Prior to operation	PMU
4. Annual greenhouse gas (GHG) emission reduction	Metric tons of CO2e	0.00	0.00	9,300.00	19,500.00	27,000.00	33,500.00	33,500.00	Annual	PMU
5. Installed capacity of BESS	MWh	0.00	0.00	10.00	25.00	40.00	50.00	50.00	Annual	PMU
Intermediate Results Indicators:										
1. Number of new renewable energy jobs created for women	Number	0.00	0.00	0.00	4.00	8.00	12.00	12.00	Annual	PMU
2. Number of women entering project-funded renewable energy job training	Number	0.00	0.00	0.00	7.00	14.00	22.00	22.00	Annual	PMU

Annex 2: Economic and Financial Analysis

1. **Economic Analysis.** The economic analysis has been carried out for a model investment of 10 MW of solar PV and 8.4 MW/33.6 MWh of BESS in Addu. Addu City has been selected as a model for the economic analysis, as it is one of the largest outer islands in Maldives, and where 14MW out of the total 36MW solar PV planned under the project will be installed. The purpose of the analysis is to demonstrate the economic feasibility of a general investment case in solar PV generation capacity and VRE integration, which will likely be replicated in other islands. The island grid system in Addu currently has 14.25 MW of installed diesel generation capacity and 1.6 MW of solar PV. Adding another 10 MW of solar PV will require additional investment in the grid system in order to integrate further VRE capacity.

2. **Economic Analysis Results**. This investment case is projected to be economically viable despite the large upfront capital expenditure cost of USD32.8 million for solar PV, BESS and grid modernization. The estimated economic internal rate of return (EIRR) is 8.7 percent before considering the expected reduction in greenhouse gas (GHG) emissions compared to the counterfactual scenario. This EIRR is higher than the discount rate of 7.2 percent for Maldives.[1] The economic net present value (ENPV) in this case is projected to be USD3.7 million. The positive economic feasibility is mainly from savings of diesel consumption, estimated at over 4.3 million liters per annum. The proposed investments under the project will also reduce cumulative GHG emissions by about 186,400 metric tons of CO_2 equivalent from 2021 to 2040. Once this is taken into account, the EIRR increases to 10.5 percent, and the ENPV is projected to be USD8.4 million, considering the low values of the shadow price of carbon.[2] Four sensitivity tests were conducted for the following scenarios: (a) 10 percent/20 percent decrease in market diesel price and (b) one-year/ two-year delay in benefits. All scenarios yielded EIRR of above or equal to eight percent, including the expected reduction in GHG emissions.

3. Further, once the result of the Addu model analysis is applied to estimate the project-level impact on fiscal sustainability, the project is expected to reduce diesel consumption by about 15.6 million liters per year. Abstracting from general equilibrium and indirect effects, this will directly and positively affect macroeconomic aggregates for the country. The proposed project would reduce Maldives' import bill by about USD8 million annually. If the potential reduction is compared to macroeconomic estimates for the year 2021 and 2022, it would reduce the current account deficit in 2021 and 2022 by -0.15 percentage points of GDP. Further, based on World Bank Commodity Price Outlook, the government would reduce annual fuel subsidies by USD2.6 million in the year of 2021, assuming the project delivers a total of 36 MW of solar PV. This would reduce fiscal deficit

[1] Based on the World Bank's guidance note issued in May 2016 on "Discounting Costs and Benefits in Economic Analysis of World Bank Projects," the discount rate is twice the expected long-term per capita growth rate of the country. An average per capita real GDP growth rate of about 3.6 percent is expected from 2020 to 2022, based on World Bank estimates. The discount rates used for previous World Bank projects ranged from 5.0 percent to 9.0 percent.

[2] World Bank 2017. Guidance Note on Shadow Price of Carbon in Economic Analysis. In line with the High-Level Commission on Carbon Prices, this analysis uses a low estimate of the carbon price starting at USD40 in 2020 and increasing to USD50 by 2030.

in the country by a nominal 0.03 percentage points of GDP over the baseline projected fiscal deficit level.[3]

4. **Financial Analysis.** The financial analysis has been conducted for the Addu model investment. The following investment cases are analyzed (1) from the perspective of an IPP investing in solar PV under a PPA commercial arrangement and (2) from the perspective of the Ministry of Environment and FENAKA on signing the same solar PPA and investing in BESS and grid modernization with both concessional and commercial financing.

5. **Financial Analysis Results**. The analysis shows that in the first scenario, IPP investment in solar PV in the Maldives is financially feasible. This scenario considers an upfront capital cost of USD13 million with a mix of floating solar PV and ground-mounted solar PV, and a PPA tariff of 13 US cents/kWh.[4] The internal rate of return to equity holders after debt service is estimated at approximately 15.6 percent, which is on par with the current rate of return on equity (15 percent) required by the market for investments in Maldives.

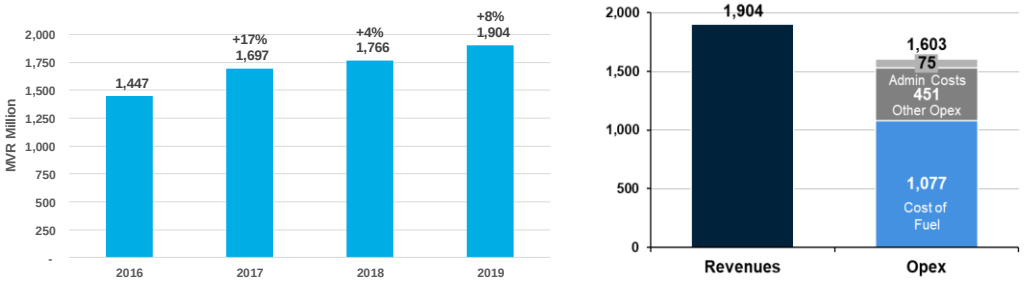
6. In the second scenario, the analysis shows that it is financially viable for FENAKA to invest in BESS and VRE integration and purchase electricity from an IPP. In this scenario, considering the market fuel price of MVR11.19 (USD0.7262) per liter, the financial internal rate of return (FIRR) for FENAKA is projected to be 13.3 percent. Considering World Bank's hurdle rate of 10 percent, the financial net present value is approximately USD2.7 million. However, FENAKA purchases diesel at a lower cost due to the fuel subsidy paid by the government to the State Trading Organization (STO). If the subsidized fuel price is applied in the analysis, the FIRR would decrease to three percent. As such, the analysis reveals that the government would likely need to consider revisiting its subsidy scheme to align incentives and promote renewable energy development.

Financial Analysis of STELCO

7. **Revenues and Operating Expenditures.** Financial analysis has been undertaken based on STELCO's 2016, 2017 and 2018 audited financial statements. STELCO's revenues have grown steadily over the past four years, with total revenue increasing by 32 percent from 2016 to 2019. Historically, the sale of electricity has accounted for more than 95 percent of the company's total revenues, while the rest of its revenues come from sources like water bottling and rental incomes. STELCO's operating expenditures have been kept under control in recent years. Diesel costs represent the largest share of STELCO's operating expenditures, and the rest are mostly costs of spares and staff costs. STELCO's revenue in 2016-2019 as well as the breakdown of its operating expenses in 2019 are presented in Figure A.1.

[3] World Bank staff internal calculation.
[4] Based on solar PV only, excluding BESS.

Figure A.1: STELCO Revenues 2016-2019 (MVR million)



Source: STELCO, World Bank.

8. **Profitability.** As presented in Table A.1., STELCO has been posting positive and increasing EBITDA margin since 2017 regardless of marginal direct Government of Maldives subsidies. The usage subsidy to cover insufficient tariff revenue is not substantial in the Greater Malé region served by STELCO, and therefore, unlike FENAKA, the direct usage subsidy to STELCO is limited, amounting to MVR27.9 million (USD1.8 million) in 2019. The indirect subsidy that STELCO receives in the form of a subsidized cost of diesel has been sufficient for STELCO to post profits since 2017.

Table A.1: STELCO 2016-2019 EBITDA Margin

	2016	2017	2018	2019
EBITDA Margin	6%	14%	15%	16%

Source: STELCO.

9. **Working Capital.** Despite good operating performance over the past three years, STELCO's working capital management has been deteriorating. Payables have been on an upward trend since 2016, reaching almost seven months of operating expenditures in 2019, which could be indicative of STELCO's inability to pay its suppliers on time. Receivables, on the other hand, have been steadier, at around three to four months of receivables over the past four years.

10. **Leverage.** STELCO has resorted to commercial borrowing to finance its capital expenditures. The company has been making large long-term borrowings to invest in new electricity generation capacity. Consequently, STELCO's debt has more than doubled from 2016 to 2019, reaching MVR2.3 billion (USD149 million) in 2019, which translates into a high net debt to EBITDA ratio of 7.4x. From 2016 to 2019, STELCO's net debt to EBITDA was at 10.8x, 5.4x, 8.1x and 7.4x, respectively.

11. **Projected Earnings on Account of the COVID-19 Pandemic**. As tourism slows down, the GDP of Maldives is expected to shrink by 29 percent in 2020, which may reduce electricity demand and negatively impact STELCO's revenues. With reduced demand, falling collections and the inability to increase tariffs, STELCO's total revenues during 2020-2021 are projected to decrease by a total of MVR888 million (USD57.6 million) as compared to the revenues expected

before the COVID-19 outbreak.[5] Consequently, STELCO's net income is expected to decrease by a total of MVR625 million (USD41.9 million) under the COVID-19 scenario, of which MVR336 million (USD21.8 million) of net losses will occur during 2020 to 2021. The fall in revenues are partially offset by the lower electricity generation due to reduced demand. STELCO's diesel cost are projected to reduce by MVR203 million (USD13.2 million), with proportional reduction in other variable operating expenses, while the administrative expenses are to be incurred at pre-COVID levels. STELCO's revenues are expected to break even starting in 2021, and recover to pre-COVID-19 levels in 2022 and post consistently rising profits each year.

12. Apart from working capital issues due to reduced collections in 2020, STELCO is not expected to require large government subsidies to cover any operating shortfall. However, even with STELCO buying diesel at a subsidized price, the company will require government support to finance its capital expenditures to continue electricity generation operations, as it may not be able to generate sufficient cash from its operations. Based on historical trends, STELCO is expected to require annual capital expenditures of MVR600 million (USD39 million) to continue its diesel-powered electricity generation operations along with an additional capital investment of MVR86 million (USD5.6 million) in 2021 to install 8 MW of battery storage capacity. Assuming that 30 percent of the annual investment in the diesel plants and the entirety of the investment in battery storage is raised through debt, STELCO is still expected to face a total cash deficit of MVR1,299 million (USD84 million) from 2020 to 2024, which will have to be financed by the Government of Maldives through capital injections, subsidies or grants.

Table A.2: STELCO Projected Cash Flow Statement (including impact of the project)

	Actuals	*Actuals*	*Actuals*	*Actuals**	*Forecast*	*Forecast*	*Forecast*	*Forecast*	*Forecast*	*Forecast*
MVR Million	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Net Income	(65)	60	72	121	(240)	(96)	36	51	69	92
Depreciation	82	99	105	98	166	186	209	226	243	259
Interest Expenses	(76)	82	89	112	145	156	173	185	196	207
Deferred Income	(2)	(2)	(2)	0	0	0	0	0	0	0
Operating Profit before WC changes	**(61)**	**239**	**264**	**330**	**71**	**247**	**418**	**462**	**509**	**559**
WC Changes	197	33	(205)	503	(228)	0	5	5	4	4
Operating Profit after WC changes	**136**	**272**	**59**	**833**	**(157)**	**247**	**423**	**466**	**513**	**563**
Interest paid	0	0	0	(112)	(145)	(156)	(173)	(185)	(196)	(207)
Net cash generated from operating activities	**136**	**272**	**59**	**721**	**(302)**	**90**	**249**	**282**	**317**	**356**
Investment in PPE	(185)	(655)	(913)	(724)	(600)	(686)	(600)	(600)	(600)	(600)
Net cash flow used in investing activities	**(185)**	**(655)**	**(913)**	**(724)**	**(600)**	**(686)**	**(600)**	**(600)**	**(600)**	**(600)**
Proceeds from interest bearing loans	47	391	696	98	180	266	180	180	180	180
Repayement of interest bearing loans	(0)	0	(9)	0	0	0	0	0	0	0
Proceeds from Capital Grant	0	95	104	0	0	0	0	0	0	0
Cash from Capital Infusion	0	0	0	0	**558**	**330**	**171**	**138**	**103**	64
Net cash flow from financing activities	**47**	**486**	**790**	**98**	**738**	**596**	**351**	**318**	**283**	**244**
Net increase in cash and cash equivalents	**(2)**	**104**	**(64)**	**95**	**(164)**	**0**	**0**	**0**	**0**	**0**
Cash at beginning of the year	32	30	134	69	164	0	0	0	0	0
Cash at the end of the period	**30**	**134**	**69**	**164**	**0**	**0**	**0**	**0**	**0**	**0**

(*) Unaudited

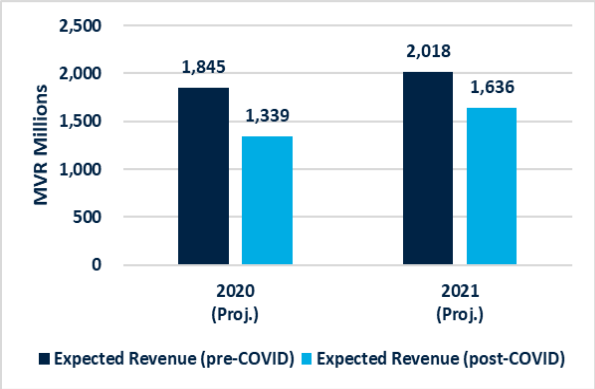
[5] Electricity consumption from 2020 to 2025 has been projected using a regression model between the historical real GDP and historical electricity consumption from 2016 to 2019, and tariffs are assumed to remain constant at 2019 levels.

Table A.3: STELCO Projected Income Statement (including impact of the project)

	Actuals	*Actuals*	*Actuals*	*Actuals**	*Forecast*	*Forecast*	*Forecast*	*Forecast*	*Forecast*	*Forecast*
MVR Million	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Revenue from Sale of Electricity	1,383	1,606	1,677	1,809	1,263	1,546	1,815	1,958	2,109	2,269
Other Income	64	91	89	95	76	90	100	111	122	134
Revenues	**1,447**	**1,697**	**1,766**	**1,904**	**1,339**	**1,636**	**1,915**	**2,068**	**2,231**	**2,403**
Growth in Revenues YoY %	*0%*	*17%*	*4%*	*8%*	*-30%*	*22%*	*17%*	*8%*	*8%*	*8%*
Cost of Fuel	871	1,011	1,006	1,077	807	868	932	997	1,066	1,139
Cost of New Solar PPA	0	0	0	0	0	20	19	19	19	19
Other Costs	391	361	412	430	366	400	433	469	506	546
Gross Margin	**185**	**325**	**348**	**398**	**166**	**348**	**531**	**583**	**639**	**700**
Gross Margin %	*13%*	*19%*	*20%*	*21%*	*12%*	*21%*	*28%*	*28%*	*29%*	*29%*
Admin Costs	65	74	72	75	79	82	86	90	95	99
Other Operating Costs	28	12	11	21	17	19	20	22	24	25
EBITDA	**92**	**240**	**264**	**302**	**71**	**247**	**424**	**471**	**521**	**575**
EBITDA Margin %	*6%*	*14%*	*15%*	*16%*	*5%*	*15%*	*22%*	*23%*	*23%*	*24%*
Depreciation & Amortization	82	99	105	98	166	186	209	226	243	259
EBIT	**9**	**140**	**159**	**204**	**(96)**	**61**	**215**	**244**	**278**	**316**
EBIT Margin %	*1%*	*8%*	*9%*	*11%*	*-7%*	*4%*	*11%*	*12%*	*12%*	*13%*
Interest	76	82	89	112	145	156	173	185	196	207
EBT	**(67)**	**58**	**70**	**92**	**(240)**	**(96)**	**42**	**60**	**82**	**108**
Margin %	*-5%*	*3%*	*4%*	*5%*	*-18%*	*-6%*	*2%*	*3%*	*4%*	*5%*
Corporate Tax	(5)	7	(39)	0	0	0	6	9	12	16
Net Income	**(62)**	**51**	**109**	**92**	**(240)**	**(96)**	**36**	**51**	**69**	**92**
Margin %	*-4%*	*3%*	*6%*	*5%*	*-18%*	*-6%*	*2%*	*2%*	*3%*	*4%*
Government Subsidy	0	0	0	28	6	7	8	8	9	10
Capital Grants taken to income	2	2	2	1	1	2	2	2	2	2
Corporate Tax (incl. subsidy)	(5)	7	(39)	0	0	0	8	10	14	18
Net Income incl. Govt. Aid	**(61)**	**53**	**111**	**121**	**(233)**	**(87)**	**44**	**59**	**79**	**102**
Margin %	*-4%*	*3%*	*6%*	*6%*	*-17%*	*-5%*	*2%*	*3%*	*4%*	*4%*

(*) Unaudited

Figure A.2: STELCO Pre- and Post-COVID Revenue and Net Income



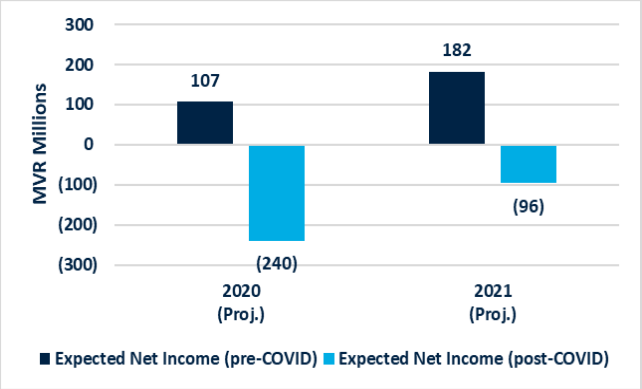


Table A.4: STELCO Balance Sheet

	Actuals	*Actuals*	*Actuals*	*Actuals**
MVR Million	**2016**	**2017**	**2018**	**2019**
Fixed Assets	**1,660**	**2,237**	**3,045**	**3,672**
Inventory	115	130	129	108
Receivables	343	336	578	479
Cash	37	134	69	164
Current Assets	**495**	**599**	**776**	**752**
Total Assets	**2,155**	**2,837**	**3,821**	**4,423**
Share Capital	150	150	150	150
Revaluation Reserve	244	230	216	216
Retained Earnings	101	158	270	445
Sharholder's Equity	**495**	**538**	**635**	**810**
Deferred Income	6	99	203	334
Deferred Tax Liabilities	58	74	33	72
Long Term Debt	716	1,152	1,832	2,301
Long Term Liabilities	**779**	**1,326**	**2,068**	**2,707**
Short Term Debt	309	275	365	(15)
Payable	572	697	753	921
Short Term Liabilities	**881**	**972**	**1,118**	**906**
Total Liabilities & Sh. Equity	**2,155**	**2,837**	**3,821**	**4,423**

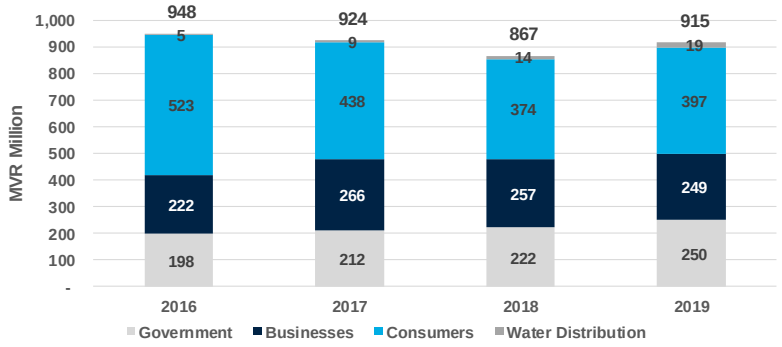
(*) Unaudited

Source: STELCO and World Bank.

Financial Analysis of FENAKA

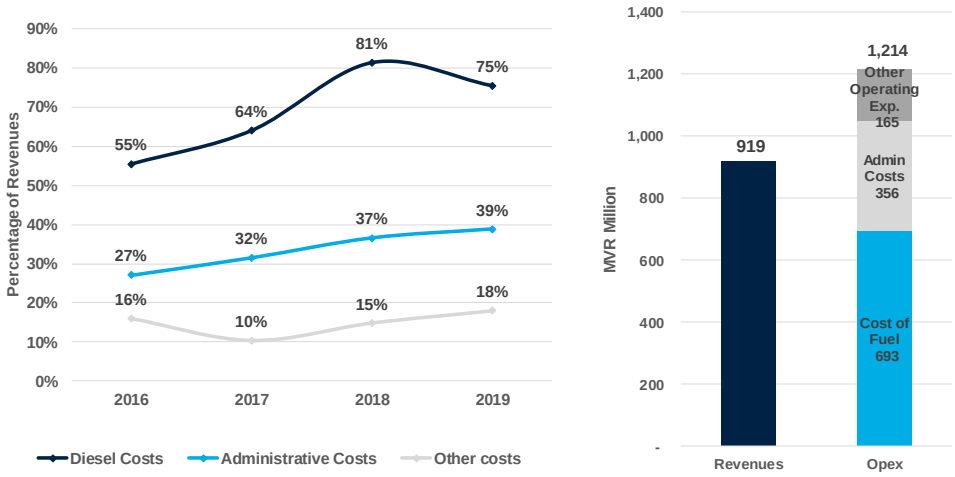
13. **Revenues.** Financial analysis has been undertaken on FENAKA's 2015, 2016 and 2017 financial statements. FENAKA's revenues have decreased or stagnated since 2016. Ninety-eight percent come from the sale of diesel-generated electricity, while the other two percent come from the provision of water distribution services. Within its electricity business, sales to domestic consumers account for the largest share of FENAKA's revenues, representing 43 percent of revenues in 2019, while sales to businesses and government in 2019 combined represented 27 percent.

Figure A.3: 2019 FENAKA Revenues from Sale of Electricity and Water Distribution (MVR million)



14. **Operating Loss**. FENAKA has posted operational losses over the last three years. Despite benefiting from diesel at a subsidized cost, FENAKA has reported operational losses every year since 2016, amounting to a total operational loss of MVR1,072 million (USD69.6 million) over the period. The situation deteriorated in 2018 and 2019, when losses before government subsidies reached -46 percent and -47 percent of revenues, respectively. In 2019, operating expenditures (OPEX) represented 132 percent of revenues, with diesel costs alone accounting for 75 percent of revenues. Administrative costs are also high as a result of FENAKA's operations being located in remote outer atolls. However, the sharp rise in these costs in recent years raises concerns about the efficiency of the company.

Figure A.4: Percentage and Breakdown of OPEX in FENAKA Revenues, 2016-2019



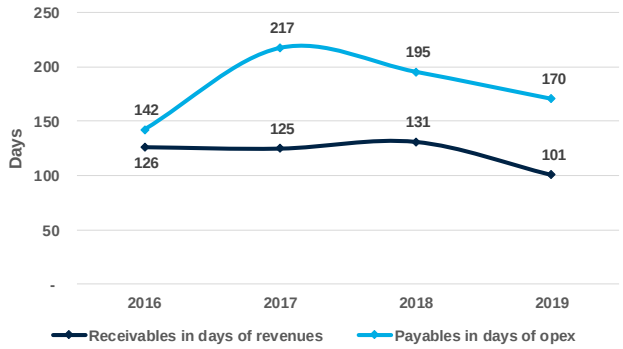
Source: FENAKA and World Bank.

15. **Government Subsidies.** The Government of Maldives had to directly subsidize FENAKA over the last three years. In order to sustain its operations, FENAKA received government support in the form of subsidies and equity grants. Usage subsidies are provided to compensate for

revenue losses incurred as a result of reductions in the retail tariff driven by the government, while equity grants are made to finance grid infrastructure. In addition to the equity grants received, FENAKA also received a total subsidy of MVR834 million (USD54.1 million) over the last three years to cover its revenue shortfall.

16. **Working Capital**. Despite improvements over the past three years, FENAKA has been struggling to pay and be paid in a timely manner. At the end of 2019, FENAKA had close to six months of payables on its books and three months of receivables. Going forward, further improvements in collection and a reduction in its operating deficits will be necessary for FENAKA to reduce its payables in a sustainable manner.

Figure A.5: 2016-2019 FENAKA Receivables and Payables (in days of revenues and OPEX)



Source: FENAKA and World Bank.

17. **Balance Sheet**. The revaluation of FENAKA's assets in 2019 led to an increase in the value of its fixed assets and equity. The revaluation exercise done by FENAKA in 2019 led to a large increase in the value of its fixed assets. Consequently, the profit associated with this asset revaluation was recorded in FENAKA's comprehensive income, which resulted in a large increase in its equity position. The 2019 numbers are not audited and are, therefore, subject to change.

Table A.5: FENAKA Balance Sheet

	Actuals	*Actuals*	*Actuals*	*Actuals**
MVR Million	**2016**	**2017**	**2018**	**2019**
Fixed Assets	**677**	**724**	**745**	**1,641**
Inventory	102	184	173	326
Receivables	344	322	312	254
Cash	21	78	39	15
Current Assets	**468**	**584**	**524**	**594**
Total Assets	**1,145**	**1,308**	**1,269**	**2,235**
Share Capital	539	539	539	1,954
Accumulated Losses	(265)	(291)	(420)	(420)
Sharholder's Equity	**274**	**248**	**119**	**1,534**
Deferred Income	373	373	373	-
Long Term Debt	93	76	102	76
Long Term Liabilities	**465**	**448**	**475**	**76**
Short Term Debt	24	19	59	59
Payable	382	593	617	567
Short Term Liabilities	**406**	**612**	**675**	**625**
Total Liabilities & Sh. Equity	**1,145**	**1,308**	**1,269**	**2,235**

(*) Unaudited

Source: FENAKA and World Bank.

18. **Projected Earnings in the Aftermath of COVID-19**. FENAKA has limited room to increase its revenues. Given that the price of electricity charged by the company to its customers is already high at MVR3.5/kWh (23 US cents/kWh) on average, a significant tariff increase would be painful for the economy and difficult to implement in an already challenging macroeconomic context. Consequently, FENAKA needs to improve its financial performance and reduce its reliance on fiscal transfers through reductions in operating costs and power generation.

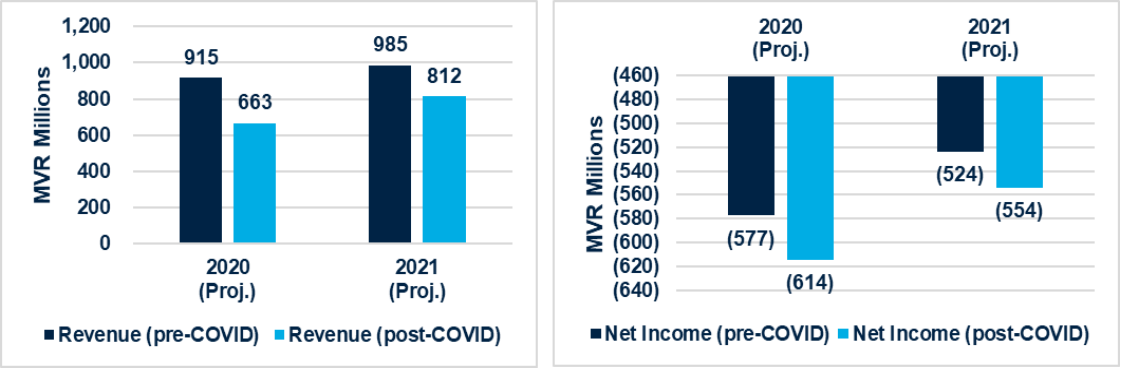
19. Financial projections assume FENAKA continues to receive diesel at a subsidized price. As per the current arrangement, FENAKA buys diesel at the subsidized price from STO. The assumption made for FENAKA's financial projections is that this price will remain unchanged. The domestic diesel price has fallen to MVR8.71 per liter in March 2020, but the subsidized price to FENAKA remains lower than this level. It has also been assumed that in case of sudden MVR devaluation against the USD, the current arrangement would stay in place.

20. FENAKA's revenues are expected to decrease sharply in 2020 and start recovering in 2021, but pre-COVID-19 revenues are only expected to be achieved in 2022. Tourism-related activities are expected to slow down in Maldives on account of lockdowns being enforced in tourist-sending countries. Consequently, the real GDP of Maldives is expected to shrink by 13 percent in 2020. The GDP contraction will translate into lower electricity demand, which will impact FENAKA's revenues. Projected electricity consumption from 2020 to 2025 has been modeled using a regression between the historical GDP and historical electricity consumption from 2016 to 2019. Tariffs are assumed to remain constant at 2019 levels over the period.

21. The expected 28 percent drop in revenue in 2020 caused by the COVID-19 pandemic will only be partially offset by lower generation costs. With reduced electricity demand, falling

collections and the inability to increase tariffs, FENAKA's total revenues during these two years are expected to decrease by a total of MVR425 million (USD27.6 million) as compared to revenues expected before the COVID-19 pandemic. Due to lower electricity generation, FENAKA's diesel costs will reduce by MVR280 million (USD18 million). Other variable operating expenses will also reduce in proportion to the reduction of electricity units, but administrative expenses will continue to be incurred at pre-COVID-19 levels. The fixed staff costs have also been assumed to continue their historical trends and add up to a total of 43 percent of the revenue from 2020 to 2025.

Figure A.6: FENAKA Pre- and Post- COVID Revenue and Net Income



Source: FENAKA and World Bank.

22. From 2020 to 2025, FENAKA will continue to require significant government subsidies and grants to cover its operating expenditures. During this six-year period, FENAKA is projected to suffer a total accumulated negative EBITDA of MVR2,191 million (USD142.2 million) and a net loss of MVR3,626 million (USD235.3 million), before any government subsidy extended to the company.

Table A.7: FENAKA Projected Income Statement (including impact of the project)

	Actuals	*Actuals*	*Actuals*	*Actuals**	*Forecast*	*Forecast*	*Forecast*	*Forecast*	*Forecast*	*Forecast*
MVR Million	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Revenue from Sale of Electricity	943	915	853	896	648	790	898	1,012	1,133	1,262
Other Income	52	27	17	22	15	22	28	34	41	47
Revenues	**995**	**943**	**870**	**919**	**663**	**812**	**926**	**1,046**	**1,174**	**1,309**
Growth in Revenues YoY %		*-5%*	*-8%*	*+6%*	*-28%*	*+23%*	*+14%*	*+13%*	*+12%*	*+12%*
Cost of Fuel	552	603	708	693	555	548	637	727	822	920
Cost of New Solar PPA	-	-	-	-	-	69	68	67	67	66
Other Costs	71	54	75	90	59	68	79	90	102	114
Gross Margin	**373**	**285**	**87**	**135**	**48**	**127**	**142**	**162**	**184**	**208**
Gross Margin %	*37%*	*30%*	*10%*	*15%*	*7%*	*16%*	*15%*	*15%*	*16%*	*16%*
Admin Costs	259	288	299	335	346	374	403	434	468	504
Other Operating Costs	98	53	72	96	60	73	83	94	105	117
EBITDA	**15**	**(55)**	**(284)**	**(296)**	**(358)**	**(321)**	**(344)**	**(367)**	**(389)**	**(412)**
EBITDA Margin %	*2%*	*-6%*	*-33%*	*-32%*	*-54%*	*-39%*	*-37%*	*-35%*	*-33%*	*-31%*
Depreciation & Amortization	101	100	107	131	253	229	256	232	211	194
EBIT	**(86)**	**(155)**	**(392)**	**(427)**	**(611)**	**(550)**	**(600)**	**(598)**	**(601)**	**(606)**
EBIT Margin %	*-9%*	*-16%*	*-45%*	*-46%*	*-92%*	*-68%*	*-65%*	*-57%*	*-51%*	*-46%*
Interest	2	2	5	4	3	4	12	13	14	14
EBT	**(87)**	**(157)**	**(397)**	**(431)**	**(614)**	**(554)**	**(612)**	**(611)**	**(614)**	**(621)**
Margin %	*-9%*	*-17%*	*-46%*	*-47%*	*-93%*	*-68%*	*-66%*	*-58%*	*-52%*	*-47%*
Corporate Tax	-	-	-	-	-	-	-	-	-	-
Net Income	**(87)**	**(157)**	**(397)**	**(431)**	**(614)**	**(554)**	**(612)**	**(611)**	**(614)**	**(621)**
Margin %	*-9%*	*-17%*	*-46%*	*-47%*	*-93%*	*-68%*	*-66%*	*-58%*	*-52%*	*-47%*
Government Subsidy	-	132	267	435	227	276	314	354	396	441
Corporate Tax (incl. subsidy)	-	-	-	-	-	-	-	-	-	-
Net Income incl. Govt. Subsidy	**(87)**	**(25)**	**(129)**	**4**	**(388)**	**(278)**	**(298)**	**(257)**	**(218)**	**(180)**
Margin %	*-9%*	*-3%*	*-15%*	*0%*	*-58%*	*-34%*	*-32%*	*-25%*	*-19%*	*-14%*

(*) Unaudited

Source: FENAKA and World Bank.

23. FENAKA will require capital injections from the Government of Maldives to finance its capital expenditures program. Based on historical trends, FENAKA will need to finance annual capital expenditures of MVR100 million (USD6.5 million) to continue its diesel-powered electricity generation operations along with an additional capital investment of MVR301 million (USD19.5 million) in 2021 to install 28 MW of battery storage capacity. The assumption used for projecting FENAKA's finances is that that the entirety of the capital expenditures for battery storage and 30 percent of the annual investment in the diesel plants is financed with debt and the remaining 70 percent will be received through a capital grant from the government. Despite this extension of debt and grants of MVR420 million (USD27.3 million) from the government, FENAKA is still projected to require additional capital injections amounting to MVR2,200 million (USD142.8 million).

24. The Government of Maldives plans to establish the Utility Regulatory Authority (URA) for improving operational efficiency of the utilities. The URA will conduct regulatory, financial and technical audits, and oversee utility operations. By improving data collection and transparency, the URA is expected to contribute to improving operational efficiency of the utilities. Component 4 of the project will support some of the analytic work required for this purpose.

Table A.8: FENAKA Projected Cash Flow Statement (including impact of the project)

	Actuals	*Actuals*	*Actuals*	*Actuals**	*Forecast*	*Forecast*	*Forecast*	*Forecast*	*Forecast*	*Forecast*
MVR Million	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Net Income	(87)	(25)	(129)	4	(614)	(554)	(612)	(611)	(614)	(621)
Depreciation	100	100	105	130	252	229	255	232	211	194
Amortisation of intangible assets	0	0	2	1	0	0	0	0	0	0
Interest Expenses	2	2	5	4	3	4	12	13	14	14
Operating Profit before WC changes	**15**	**77**	**(17)**	**139**	**(358)**	**(321)**	**(344)**	**(367)**	**(389)**	**(412)**
WC Changes	81	151	44	(40)	72	(37)	(4)	3	2	1
Operating Profit after WC changes	**96**	**228**	**27**	**98**	**(286)**	**(357)**	**(348)**	**(364)**	**(388)**	**(412)**
Interest paid	(2)	(2)	(5)	(4)	(3)	(4)	(12)	(13)	(14)	(14)
Net cash generated from operating activities	**95**	**226**	**22**	**95**	**(290)**	**(361)**	**(360)**	**(377)**	**(401)**	**(426)**
Investment in PPE	(90)	(148)	(124)	(85)	(100)	(401)	(100)	(100)	(100)	(100)
Investment in Intangible assets	(0)	(0)	(4)	0	0	0	0	0	0	0
Net cash flow used in investing activities	(90)	(148)	(128)	(85)	(100)	(401)	(100)	(100)	(100)	(100)
Proceeds from issuance of shares	7	0	0	0	0	0	0	0	0	0
Proceeds from interest bearing loans	0	0	120	0	30	331	30	30	30	30
Repayement of interest bearing loans	(18)	(17)	(53)	(33)	0	0	0	0	0	0
Proceeds from Capital Grant	0	0	0	0	70	70	70	70	70	70
Cash from Capital Infusion	0	0	0	0	**275**	**361**	**360**	**377**	**401**	**426**
Net cash flow from financing activities	**(11)**	**(17)**	**67**	**(33)**	**375**	**763**	**460**	**477**	**501**	**526**
Net increase in cash and cash equivalents	**(6)**	**61**	**(39)**	**(24)**	**(15)**	**0**	**0**	**0**	**0**	**0**
Cash at beginning of the year	22	16	78	39	15	0	0	0	0	0
Cash at the end of the period	**16**	**78**	**39**	**15**	**0**	**0**	**0**	**0**	**0**	**0**

(*) Unaudited

Source: FENAKA and World Bank.

25. **Government Subsidy and Fiscal Impact**. Both STELCO and FENAKA rely heavily on the government for fuel and usage subsides. In 2019, the fuel subsidy paid by the Government of Maldives to STO amounted to approximately USD38 million, accounting for 62 percent of all energy subsidies. The government provides the fuel subsidy to STO in order to lower the fuel price for the utilities and, consequently, to lower the cost of electricity generation in the country. The fuel subsidy is applied if the fuel cost per liter is above a threshold baseline rate. Since 2017, the fuel price to utilities has been maintained at a maximum baseline price per liter as the market price has been higher. The difference between the market price and baseline price is then paid off directly to STO as a subsidy.

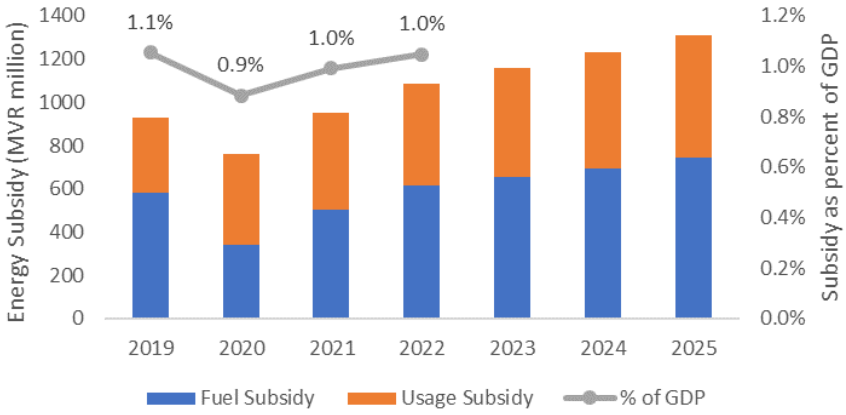
26. The usage subsidy was approximately USD23 million in 2019, making up roughly 38 percent of all energy subsidies. The Government of Maldives has adjusted electricity tariffs several times since 2009 and harmonized tariffs across all islands to improve affordability of electricity service. As a result, the cost of electricity service has become higher than the retail tariff of electricity, in particular, for remote outer atolls. As such, FENAKA, which serves customers in outer atolls, is unable to recover its cost from tariff revenue. The usage subsidy serves to compensate the utilities for revenue losses due to reductions in the retail electricity tariff, directly paid to the utilities by the government. STELCO received eight percent of the total usage subsidy, while the majority was paid to FENAKA.

27. The current administration may not raise the tariff for the purpose of improving cost recovery. Despite high electricity tariffs compared to neighboring countries, tariffs in Maldives are

not sufficient to enable full cost recovery. This is especially the case in remote outer islands where the cost of service can be as high as 69 US cents/kWh. The Government of Maldives has committed to reduce the electricity burden on small businesses and increasing the affordability of electricity for all citizens. With insufficient electricity tariff, the utilities have benefitted directly from the usage subsidy and indirectly from the fuel subsidy. As such, the subsidies transferred from the government are critical in sustaining the operations of the utilities and continuing electricity service.

28. To uphold its commitment in providing affordable electricity, the Government of Maldives is expected to continue to provide subsidies to the sector. Fuel and usage subsidies to the electricity sector reached approximately USD60 million in 2019, about one percent of GDP and 3.6 percent of fiscal expenditure. Both fuel and usage subsidies are expected to drop in 2020, due to the COVID-19 impact and consequent economic slowdown. Given its marginal magnitude relative to total fiscal revenue and expenditure and the critical importance of continuing electricity service for the economy, the government is believed to continue budget transfers to the energy sector, maintaining the level of subsidies around one percent of GDP. The global oil price until 2025 is assumed based on the World Bank Commodity Price Outlook until 2025. GDP forecast until 2022 is based on the latest World Bank Marco and Poverty Outlook.

Figure A.7: Projected Total Energy Subsidy, 2020-2025



Annex 3: Debt Sustainability Analysis

Macroeconomic Performance

1. Maldives had enjoyed robust economic growth prior to COVID-19. Following average real GDP growth of six percent from 2014 to 2018, real GDP is estimated to have grown by seven percent in 2019, driven by tourism and related travel services. Total visitor arrivals reached a record of 1.7 million, 14.7 percent higher than in the previous year, largely thanks to a doubling of visitors from India. However, a small contraction in construction activity (-0.3 percent) dragged growth, as several large infrastructure projects related to transport and housing reached completion. Slower import growth, especially of capital goods linked to construction, led the current account deficit to narrow to 26.8 percent of GDP in 2019 from 28.3 percent in 2018. However, the fiscal deficit remained elevated, widening to 5.8 percent of GDP in 2019 from 5.3 percent in 2018. Total public and publicly guaranteed debt also remained elevated at 78.4 percent of GDP at the end of 2019.

2. The COVID-19 pandemic has paralyzed Maldives' economy through its impact on tourism. According to estimates by Statistics Maldives, real GDP contracted by 51.6 percent year-on-year in Q2 2020 due to border closure and stringent mobility restrictions. Tourism inflows have gradually resumed since borders reopened in mid-July, with 40,000 tourists visiting between then and end-October, but remain 70 percent lower than pre-COVID levels. Construction, the other main driver of growth, also slumped due to logistical difficulties and repatriations of foreign workers following COVID-19 outbreaks. With overall depressed activity, price controls on staple food and additional subsidies on utility bills, prices fell by an average of four percent year-on-year in Q2 2020. The deflation was more pronounced in Malé than in the atolls.

3. Weak domestic activity and low oil prices have led the goods trade deficit to narrow by USD620 billion from January to September 2020 compared to the same period a year ago. Merchandise imports fell by 32.4 percent year-on-year from January to September 2020, driven by lower imports of capital goods, diesel, and food and beverages consumed by tourists. Merchandise exports also fell by 20.4 percent year-on-year over the same period, mostly on account of lower re-exports of jet fue`l from muted air traffic, but also due to lower fish exports owing o lockdowns in Europe and and lower yield during the monsoon season.

4. As foreign exchange earnings from tourism plummeted, usable reserves fell from USD311.3 million at end-January to USD198.4 million as of end-August, equivalent to 0.9 months of 2019 goods imports. Nonetheless, Maldives maintains a de facto stabilized exchange rate arrangement. To help maintain exchange rate stability, the Maldives Monetary Authority activated a USD150 million foreign currency swap with the Reserve Bank of India.

5. Fiscal imbalances have widened significantly. Although the state collected only USD711.5 million in revenues and grants from January to September (39 percent less than the corresponding period of 2019), there was no commensurate adjustment in spending. While there was some degree of fiscal consolidation on the recurrent side, capital spending grew by 20.7

percent year-on-year, mainly due to land reclamation and harbor reconstruction projects under the Public Sector Investment Program. Total spending thus amounted to USD1.3 billion over January to September, only 1.4 percent less than the same period in 2019. Public and publicly guaranteed debt rose to USD4.8 billion as of end-June 2020, a significant increase from USD4.4 billion as of end-2019.

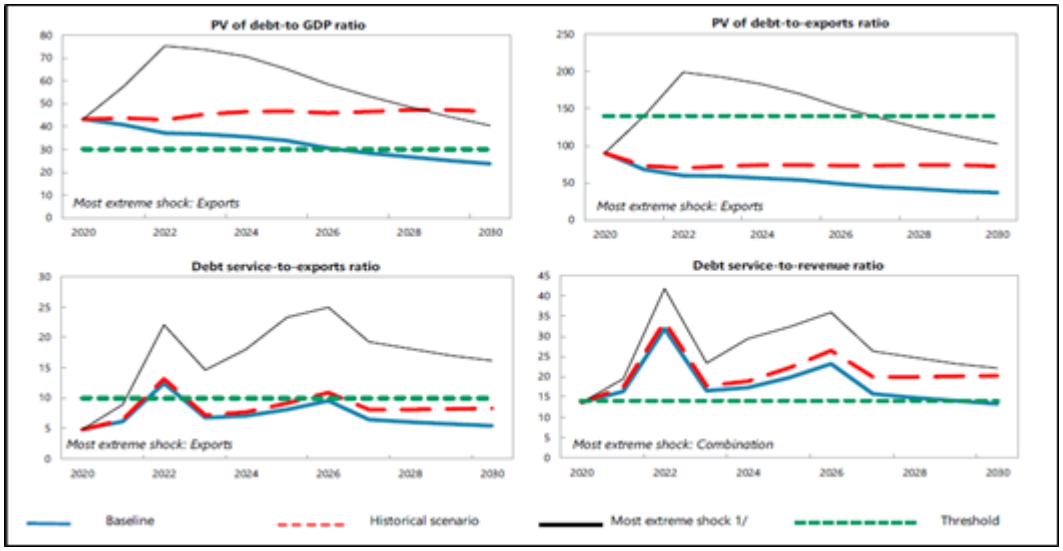
6. In a baseline scenario that assumes borders remain open and tourists gradually return, GDP is projected to shrink by 20.5 percent in 2020. Thereafter, it is expected to rebound to 10.5 percent in 2021 largely thanks to base effects and the expected resumption of tourism once a COVID-19 vaccine is commercially available, tentatively by mid-year. Despite lower remittance outflows and some import compression, the current account deficit is projected to widen to 28.5 percent of GDP due to the significant fall in the denominator. The fiscal deficit is also projected to rise to 24.5 percent of GDP as the government has not sufficiently reduced expenditures in line with revenues. As a result, public and publicly guaranteed debt is expected to reach 124.9 percent of GDP in 2020.

Debt Sustainability Analysis

7. At end-2019, total public and publicly guaranteed debt stood at an estimated 78.4 percent of GDP or USD4.4 billion. Domestic, external and guaranteed debt accounted for 25.4, 15.8 and 37.1 percent of GDP, respectively. The increase in guaranteed debt is the main driver of debt vulnerabilities in recent years, growing by 11.5 percentage points from 2017 to 2019. This new borrowing mainly financed large investments in public infrastructure, e.g., the end of the connecting bridge, the airport runway, housing developments in Hulhumalé and the new airport passenger terminal. Many of these investments were undertaken by state-owned enterprises with sovereign guarantees.

8. According to the latest World Bank–IMF Debt Sustainability Analysis (April 2020), the Maldives remains at high risk of external (and overall) debt distress. In the baseline scenario, all external indicators breach their thresholds except the PV of debt-to-exports ratio (Figure 3.1). The Maldives placed two sovereign bonds in 2017 and 2018, totaling USD350 million or 16 percent of total external debt in December 2019. Rollover risks from the repayment of these bonds in 2022 and 2023 were mitigated by proceeds accumulated in the Sovereign Development Fund, as well as the preemptive voluntary extension of the privately placed USD100 million bond that was due in 2023 to 2026. Based on information available as of April 2020, the debt outlook was assessed as sustainable. However, this was predicated on the implementation of the authorities' pledges to reprioritize and cut capital spending, which requires a high level of commitment, as well as the assumption that growth will rebound strongly in 2021 as tourists return.

Figure 3.1: Joint IMF-World Bank Debt Sustainability Analysis



Source: World Bank-IMF Joint LIC-DSA (2020).

9. The proposed financing is to be provided as a combination of IDA grants (USD12.4 million), a CTF grant (USD7 million), a CTF loan (USD23 million), and an AIIB loan (USD20 million). The CTF loan would be provided on the following terms: 0.25 percent interest rate, 40-year repayment and 10-year grace period. The direct loan to the Government of Maldives is USD28 million in total on highly concessional terms.

10. The total project debt accounts for 1.4 percent of current total public and publicly guaranteed debt (4.7 percent of total external public debt). The CTF loan in isolation would account for 0.5 percent of total public debt and 1.6 percent of total external public debt. The project will therefore mildly impact overall indebtedness but will not, by itself, lead to a further breach of thresholds in the debt sustainability analysis. Considering that the loan will help Maldives to reduce its reliance on fuel imports and move toward a more sustainable mix of energy generation, in the longer term the project has the potential to: (1) reduce the need for fiscal transfers to the electricity sector (through fuel subsidies for electricity generation), (2) reduce the country's overall vulnerability to oil price fluctuations and (3) reduce the current account deficit.

Annex 4: Sovereign Credit Fact Sheet

A. Recent Economic Development

1. Maldives is an upper middle-income country with GDP per capita at USD10,627 and a population of 530,953 in 2019. After growing at an average annual rate of 6.7 percent during 2016 to 2018, growth decelerated to 5.7 percent in 2019 according to IMF's World Economic Outlook released in October 2020.[6] Government infrastructure investment, tourism and construction have been the main drivers of growth 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. Maldives has been one of the worst-impacted economies due to the COVID-19 pandemic given its overwhelming dependence on tourism. The economy contracted significantly by 51.6 percent in Q2 2020, as all sectors of the economy were severely affected by the pandemic. Tourism sector took the biggest hit as output declined by 98 percent. Similarly, construction and fishery saw output declining by around 50 percent. In November 2020, Fitch revised Maldives' Long-term Foreign-Currency Issuer Default Rating (IDR) to CCC from B, given the drastic rise in Maldives' debt burden and elevated liquidity pressure.

2. Overall inflation remained subdued at 1.3 percent in 2019 mainly due to government's price controls on key staples and lower global oil and food prices. Low inflationary pressure allowed the central bank to maintain an accommodative policy stance. The first three quarters of 2020 witnessed monthly price index contracting by 1.4 percent. The reduction in price level was driven by drop in prices of utilities as households received electricity and water utility subsidies as COVID-19 relief. Transportation, information and communication and education services also experienced deflation. Only food products and health services witnessed a rise in price levels.

3. According to the IMF, fiscal deficit widened to 6.4 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. Government debt increased during 2019 with the government borrowing both from domestic and international lenders. The fiscal deficit during January to October 2020 widened significantly as government revenue and grants decreased by 36.2 percent compared to the previous year, while expenditure dropped only by 2.1 percent. [7]

4. Despite strong growth, the country faced stress on external account. Maldives' current account deficit remained over 25 percent of GDP for the second year in a row in 2019. The current account deficit was primarily financed by foreign direct investment and other investment liabilities

[6] Government of Maldives statistics indicate that the average growth for 2016 to 2018 was 7.2 percent and the growth for 2019 was seven percent.
[7] Maldives in Figures, November 2020, National Bureau of Statistics, Ministry of National Planning, Housing and Infrastructure

incurred by public sector enterprises with government guarantees. During January to October 2020, exports contracted by 19 percent reflecting sharp drop in marine exports as global demand collapsed. Imports also contracted by 34 percent due to lower import of food, fuel and capital goods.[8] Tourism receipts declined by 66 percent in the first three quarters of 2020 in comparison with the first three quarters of the preceding year.[9] In October 2020, reserves were 17.8 percent lower compared to the beginning of the year due to lower foreign capital inflows and tourism earnings. The COVID-19 shock created a large external financing gap, for which the government sought Rapid Credit Facility of the IMF and substantial financing from other development partners.

B. Economic Indicators

Selected Macroeconomic Indicators (2017-2022)

Economic Indicators	2017	2018	2019	2020*	2021*
Real GDP growth	6.8	6.9	5.7	-18.6	12.7
Inflation (% change, average)	2.3	1.4	1.3	0.4	2.7
Current account balance (% of GDP)	-21.7	-26.4	-26.0	-31.8	-17.0
Central government overall balance (% of GDP)	-6.3	-5.2	-6.4	-21.9	-15.7
Nominal gross public debt (% of GDP)	61.3	71.3	78.0	118.3	119.2
Public gross financing needs (% of GDP)	7.7	6.7	8.6	23.4	20.1
External debt (% of GDP)	35.6	50.4	54.2	84.2	82.3
Gross external financing need (% of GDP)	17.0	20.9	15.4	29.7	13.4
Gross reserves (USD million)	588	712	753		
Exchange rate (MVR/USD, EOP) ***	15.4	15.4	15.4	15.4	-

Note: * denotes projected figures.
*** FX rate from Maldives Monetary Authority, 2020 FX data as of December 2020
Source: IMF World Economic Outlook, October 2020 and IMF Country Report No. 20/133.

C. Economic Outlook and Risks

5. Looking ahead, IMF projects Maldives' economy to contract by 18.6 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-thirds of the GDP. Maldives reopened for tourism in July 15, 2020, but weak demand implies that few airlines will resume flights. Therefore, tourism arrivals are expected to be about 70 percent lower in 2020 than in 2019. Decline in tourism earnings is likely to create financial constraints for construction activity. Similarly, weak demand for marine products in key export destinations might push agrarian families into poverty. Growth is expected to rebound in 2021, largely due to a low base, but tourism could also make a strong rebound as pent up demand could be released.

[8] Maldives Monetary Authority Monthly Statistics Volume 21, November 2020.
[9] Maldives Monetary Authority. Tourism Indicators 2014-20

6. Inflation is expected to remain stable aided by lower oil prices. Inflation might pick up slightly as the government phased out the one-off discounts introduced for water tariffs in early 2020. Expected improvement in domestic demand would push inflation up.

7. According to the IMF, fiscal deficit is expected to more than triple to nearly 22 percent of GDP in 2020, compared to 2019, as the government has announced an economic recovery plan of about 3.4 percent of GDP. On the revenue side, shortfalls are expected as tourism-related receipts plunge and economic activity declines. On the expenditure side, the government is only expected to make marginal cuts. Maldives is assessed to be at high risk of debt distress, on both external and total public debt.[10] The increase in borrowing to mitigate the pandemic and a contraction of the economy in 2020 will result in public sector debt rising from 77 percent of GDP in 2019 to 118 percent of GDP in 2020, and further to 119 percent in 2021.

8. The current account deficit is projected to increase to 31.8 percent of GDP in 2020 as exports, particularly marine, and tourism earnings are deeply affected by the pandemic. Although supply-side disruptions would reduce import of construction material and related capital goods, it will not be enough to overcome the loss of tourism earnings. An anticipated recovery in tourism earnings in 2021 will result in 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 marine exports.

[10] IMF Country Report 20/133.