



Investment Facility Report

Project Number: 49450-007
November 2017

Pacific Renewable Energy Investment Facility Republic of the Marshall Islands: Majuro Power Network Strengthening Project

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Asian Development Bank

CURRENCY EQUIVALENTS

The Republic of the Marshall Islands uses the United States dollar.

ABBREVIATIONS

ADB	–	Asian Development Bank
AMI	–	advanced metering infrastructure
COFA	–	compact of free association
GDP	–	gross domestic product
GWh	–	gigawatt hour
MEC	–	Marshalls Energy Company
O&M	–	operation & maintenance
RMI	–	Republic of the Marshall Islands

NOTES

- (i) The fiscal year (FY) of the Government of the Republic of the Marshall Islands ends on 30 September. “FY” before a calendar year denotes the year in which the fiscal year ends, e.g., FY2016 ends on 30 September 2016.
- (ii) In this report, “\$” refers to United States dollars.

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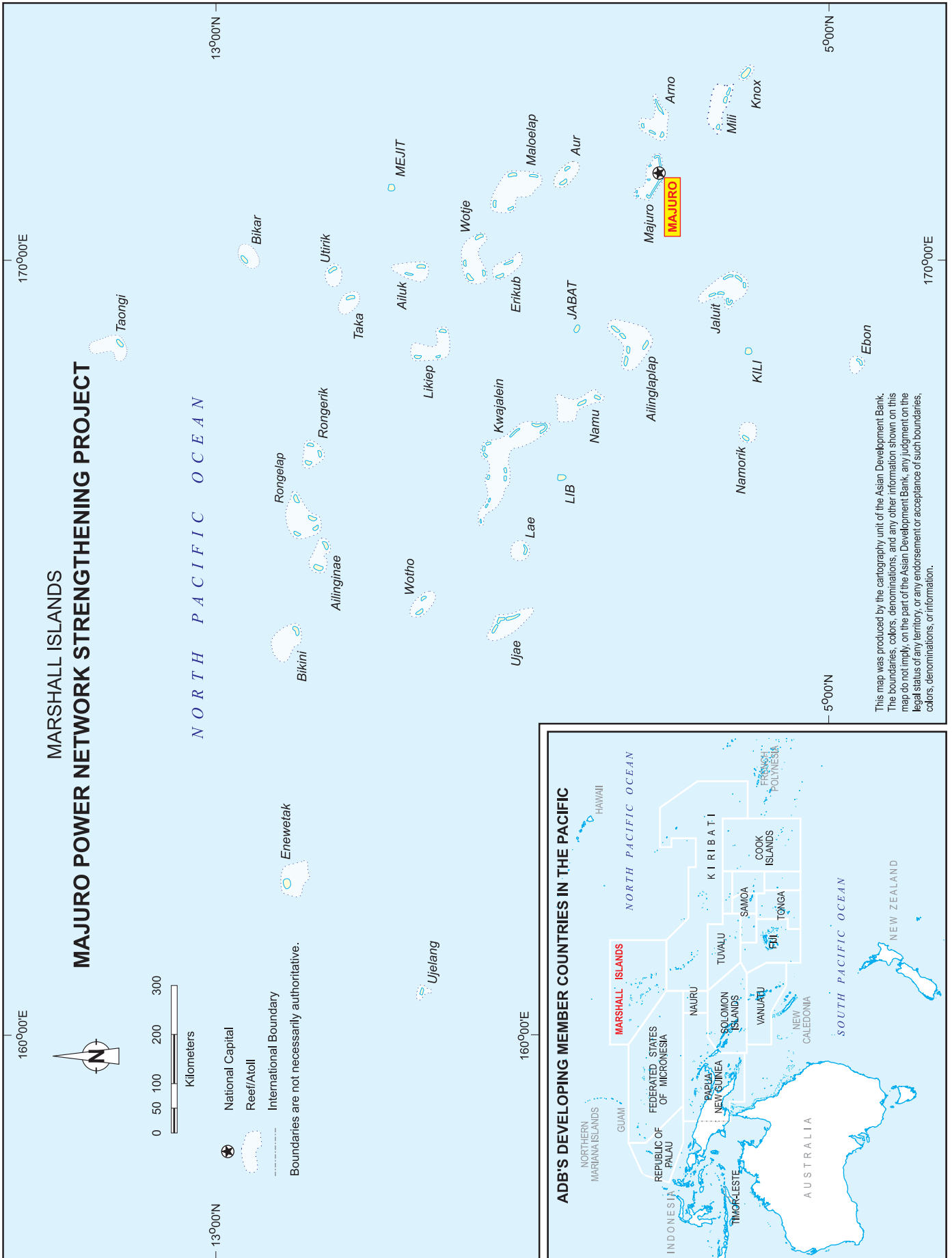
CONTENTS

	Page
PROJECT AT A GLANCE	
MAP	
I. BACKGROUND	1
II. THE PROJECT	1
A. Rationale	1
B. Impact and Outcome	4
C. Outputs	4
D. Summary Cost Estimates and Financing Plan	4
E. Implementation Arrangements	5
III. DUE DILIGENCE	6
A. Technical	6
B. Economic and Financial	6
C. Governance	6
D. Poverty, Social, and Gender	7
E. Safeguards	7
F. Summary of Risk Assessment and Risk Management Plan	8
IV. ASSURANCES	8
V. THE PRESIDENT'S DECISION	9
APPENDIXES	
1. Design and Monitoring Framework	10
2. List of Linked Documents	12

PROJECT AT A GLANCE

1. Basic Data		Project Number: 49450-007	
Project Name	Majuro Power Network Strengthening Project	Department /Division	PARD/PATE
Country Borrower	Marshall Islands, Republic of Republic of Marshall Islands	Executing Agency	Ministry of Finance
2. Sector		ADB Financing (\$ million)	
✓ Energy	Subsector(s) Electricity transmission and distribution		2.00
		Total	2.00
3. Strategic Agenda		Climate Change Information	
Inclusive economic growth (IEG) Environmentally sustainable growth (ESG)	Subcomponents Pillar 1: Economic opportunities, including jobs, created and expanded Eco-efficiency Global and regional transboundary environmental concerns	Mitigation (\$ million)	1.14
		CO ₂ reduction (tons per annum) Climate Change impact on the Project	1,745 Low
4. Drivers of Change		Gender Equity and Mainstreaming	
Governance and capacity development (GCD)	Institutional development Organizational development Public financial governance	No gender elements (NGE)	✓
Knowledge solutions (KNS)	Application and use of new knowledge solutions in key operational areas		
Partnerships (PAR)	Implementation Private Sector		
5. Poverty and SDG Targeting		Location Impact	
Geographic Targeting	No	Nation-wide	High
Household Targeting	No		
SDG Targeting	Yes		
SDG Goals	SDG7		
6. Risk Categorization:	Low		
7. Safeguard Categorization	Environment: C Involuntary Resettlement: C Indigenous Peoples: C		
8. Financing			
Modality and Sources		Amount (\$ million)	
ADB		2.00	
Sovereign Project grant: Asian Development Fund		2.00	
Cofinancing		0.00	
None		0.00	
Counterpart		0.25	
Government		0.25	
Total		2.25	
9. Effective Development Cooperation			
Use of country procurement systems		Yes	
Use of country public financial management systems		Yes	

MARSHALL ISLANDS MAJURO POWER NETWORK STRENGTHENING PROJECT



This map was produced by the cartography unit of the Asian Development Bank. The boundaries, denominations, and any other information shown on this map do not imply, on the part of the Asian Development Bank, any judgment on the legal status of any territory, or any endorsement or acceptance of such boundaries, colors, denominations, or information.

I. BACKGROUND

1. On 22 June 2017, the Board of Directors of the Asian Development Bank (ADB) approved the Pacific Renewable Energy Investment Facility (the Facility). The Facility will finance renewable energy projects in the 11 smallest Pacific developing member countries¹ with an overall estimated cost of \$750 million, including ADB financing of up to \$200 million. Upon approval, the Board delegated authority to the President to approve loans and/or grants to each targeted country for qualifying projects.
2. The grant to the Republic of the Marshall Islands (RMI) for the Majuro Power Network Strengthening Project will be financed under the Facility.²
3. The Project will install an advanced metering infrastructure (AMI) to allow Marshalls Energy Company (MEC) to manage power more efficiently, reduce losses on the Majuro power system, reduce diesel fuel consumption for power generation, and improve revenue collection. Data provided by the AMI will also inform the design of future investments in MEC's power system, including investments in renewable energy, to be financed by ADB or other sources. Concurrently, the project will develop a comprehensive program for management improvements and business process reengineering at MEC to provide for MEC's operational and financial sustainability (including financial management, accounting, and tariff formulation), and for the sustainability of current and future investments.³

II. THE PROJECT

A. Rationale

4. **Macroeconomic context.** The RMI is heavily dependent on external assistance, with annual grants averaging about 60% of gross domestic product (GDP), mostly through the Compact of Free Association (COFA) with the United States, which terminates in 2023. Unemployment is high and human development indicators are generally low; income distribution is quite uneven and poverty on the outer atolls is considerable. When grant flows from the COFA declined during 1995–2001, per-capita GDP over the same period dropped by nearly 35%. In FY2016, economic growth accelerated to 1.5%, up from 0.6% previous year, because of stronger fisheries output and the resumption of infrastructure projects connected with the COFA. ADB projects growth of 4.0% in FY2017 and 2.5% in FY2018.⁴ Average GDP growth of 1.7% is expected through 2025.⁵
5. MEC is a fully state-owned electricity utility which generates, distributes, and retails electricity on Majuro to a population of about 28,000 (roughly half of RMI's population). Serving the country's capital, the Majuro system accounts for 72% of electricity generated and consumed in the RMI (Ebeye in Kwajalein Atoll accounts for an additional 24%, while the outer islands account for the balance).

¹ Cook Islands, Kiribati, the Marshall Islands, the Federated States of Micronesia, Nauru, Palau, Samoa, Solomon Islands, Tonga, Tuvalu, and Vanuatu

² ADB. 2017. *Report and Recommendation of the President to the Board of Directors, Pacific Renewable Energy Investment Facility*. Manila.

³ The Design and Monitoring Framework is in Appendix 1.

⁴ Asian Development Outlook 2017.

⁵ RMI Economic Review. Graduate School USA, Oct. 2016.

6. **High reliance on imported petroleum fuel.** Diesel generation accounts for approximately 98% of the Majuro system's annual power generation of 53.7 GWh, consuming approximately 3.8 million gallons (14.4 million liters) of fuel per year. While Majuro enjoys an abundant solar resource, and may have an economically viable wind resource, development of additional intermittent renewable generation beyond the current 900 kWp (kilowatts peak) installed solar generation is technically infeasible without investment in network asset replacements, new fit-for-purpose efficient diesel generation, and integration control hardware to ensure network stability.

7. Exposure to volatile world oil prices is a significant vulnerability for MEC, and for the RMI economy. At the macroeconomic level, sustained high fuel costs can pose significant challenges to policymakers through their effects on growth, inflation, foreign reserves, and government resources. This feeds directly and indirectly into production and household well-being through transport, electricity, and cooking fuel costs. The 2008 oil price spike nearly bankrupted the country.

8. Decreasing its reliance on imported fossil fuels in favor of indigenous renewable resources is a priority for the RMI, but will require careful planning, phased implementation over several years, and several precursor supporting investments (starting with this AMI investment).

9. **High network losses.** Majuro exhibits abnormally high levels of technical and non-technical network losses.⁶ In 2010 the MEC estimated such losses at approximately 20% of electricity introduced into the distribution network. By comparison, typical network losses for utilities of similar size and technology in the United States are 4.2%.⁷ Reducing Majuro's network losses will significantly reduce generation requirements and corresponding diesel fuel consumption costs, while improving MEC's revenue generation by curtailing unbilled consumption.

10. The MEC has installed prepayment meters in virtually all households connected to the Majuro system (with support under a grant⁸ from the Japan Fund for Poverty Reduction, completed in 2014). While this has contributed to improved revenues, high losses continue to plague Majuro's distribution system. The AMI will implement transformer-level metering that will enable MEC to reconcile consumption recorded at end-user metering points with power delivered through each distribution transformer. The AMI will also allow MEC to identify which network areas are suffering the highest technical and nontechnical losses. This will enable the MEC to implement low-cost measures to reduce network losses such as the reconfiguration of customer supply connections to distribution transformers and repair of malfunctioning customer meters, to rapidly reduce network losses by at least 4% of generated power (2.2 GWh, with concomitant reduction in diesel consumption of 152,000 gallons, or 575,320 liters). Furthermore, the AMI will provide required data on the Majuro network's operation and power flows to inform further network loss reduction investments (e.g. replacement of oversized and high-loss transformers), as well as the siting of distributed renewable energy generation and distribution network upgrades to without jeopardizing stable system operation.

11. **Marshalls Energy Company business processes and organizational inefficiencies.** Deficiencies in MEC's business processes, including budget formulation, asset management,

⁶ This is a measure of energy lost in the utility's electrical system, and is an indicator of the efficiency of the electrical system. It represents the percentage of electrical energy generated by the utility, but not available to be sold to customers. It includes both physical losses that occur in the distribution system and metering and billing losses (theft).

⁷ APPA Selected Financial and Operating Ratios of Public Power Systems. American Public Power Association, November 2013.

⁸ Grant 9148 - Improved Energy Supply for Poor Households.

asset maintenance, cost accounting and reporting, and capital project planning and execution, among others, jeopardize MEC's long-term ability to provide power service. The consequences of these deficiencies are manifest in the extremely poor condition of MEC's core operational assets, and in its recent audited financial statements (MEC was technically insolvent in 2014 and 2015). To ensure the sustainability of investments under this project, and of future investments financed by ADB or other development partners, a far-reaching capacity-building and institutional strengthening program is essential. Separate and apart from the AMI investment, this project will engage consultants to examine MEC's business processes, management practices, and governance arrangements. Consultants will develop business process reengineering and management improvement action plans for implementation in parallel with subsequent investment projects.

12. **Tariffs, revenues, and cost controls.** MEC's financial management and accounting practices do not provide adequate basis for identification, validation, and analysis of its costs associated with providing electricity service. This impedes MEC's management's ability to control costs, and renders it impossible to determine an appropriate and justifiable revenue requirement for MEC. In the absence of reliable cost data, tariff formulation and rate design cannot be made to be cost-reflective (other than a fuel-cost adjustment provision), nor can appropriate and effective incentives through tariff policy be applied to compel MEC to control its costs. This has obvious implications for MEC's efficiency as a public utility, with accompanying adverse consequences for MEC's customers and RMI's economy. Action plans developed by consultants engaged to examine MEC's business processes, management practices, and governance arrangements (including tariff policy and procedures) will provide recommendations to remedy these and other deficiencies that plague MEC's operations.

13. **Alignment with development plans.** The project is included in ADB's Country Operations Business Plan 2017–2019 and supports the RMI's national energy policy and energy action plan to reduce consumption of imported fossil fuels and reduce losses. The Country Operations Business Plan also envisages further investments in MEC, including investments to replace network assets, support renewable power generation and associated systems, and rehabilitate MEC's fuel tank farm.

14. The project is included under Pacific Renewable Energy Investment Facility, which aims to improve regional energy security in the Pacific region. The project qualifies for financing under the facility as the facility was approved to cover supporting infrastructure, including distribution assets. The AMI (Output 1) is a distribution asset. As a precursor investment intended to facilitate the identification of subsequent investments in renewable generation, the project will contribute to achievement of targets under the Facility. Output 2 will generate business-process-reengineering and management improvement action plans, which is synonymous with the "reform documents" output target under the Facility.

15. **Supporting the Marshall Islands' renewable energy goals.** The Government of the Marshall Islands has adopted a target of 20% renewable electricity generation by 2020, and has committed to reducing greenhouse gas emissions by 35% compared with its 2010 baseline under its United Nations Framework Convention on Climate Change Paris Agreement nationally determined contributions. The RMI has a long-term target of net-zero emissions for its entire economy by 2050 under its nationally determined contributions. About 54% of the RMI's greenhouse gas emissions currently result from power generation. The RMI derives 90% of its primary energy supply from imported petroleum products. The AMI will make it easier to identify investments that support these objectives in a fiscally responsible and efficient manner, while the

business-process-reengineering and management-improvement action plans will provide for MEC's viability as a going concern.

B. Impact and Outcome

16. The project is aligned with the following impacts: (i) dependence on imported fossil fuels reduced, (ii) supply-side losses reduced, and (iii) renewable electricity generation increased⁹ (see last sentence in paragraph 10 above). The project will have the following outcome: MEC's consumption of diesel fuel for power generation reduced.¹⁰

C. Outputs

17. The project will have the following outputs: (i) Output 1 - Advanced Metering Infrastructure on Majuro distribution network installed; and (ii) Output 2 - MEC business-process-reengineering and management-improvement action plans endorsed.

18. To support Output 1, the AMI will consist of telemetry-capable meters at each distribution transformer on the Majuro power system and a central control center for collection and analysis of reported power flow data. Business-process-reengineering and management-improvement action plans under Output 2 will derive from a comprehensive examination of MEC's existing business processes, management practices and policies, and governance arrangements. The action plans will provide for wholesale transformation of MEC to render it a self-sustaining and efficient electric power utility, and are intended to be implemented as a component part of future ADB-financed investments in MEC (see paragraph 12.)

D. Summary Cost Estimates and Financing Plan

19. The project is estimated to cost \$2.247 million (Table 1). Detailed cost estimates are included in the Project Administration Manual.¹¹

Table 1: Summary Cost Estimates
(\$ million)

Item	Amount
A. Base Cost^a	
1. Advanced Metering Infrastructure ^b	1.366
2. Supervising consultants	0.234
3. Capacity-building and business-process-reengineering consultants	0.500
Subtotal (A)	2.100
B. Contingencies	
Physical	0.147
Total (A+B+C)	2.247

^a In mid-2017 prices as of 15 July 2017.

^b Includes government in-kind contribution of \$0.175 million and taxes and duties of \$0.072 million. The government will finance taxes and duties of \$0.072 million through exemption. Such an amount does not represent an excessive share of the project cost.

Source: Asian Development Bank estimates

⁹ Ministry of Resources and Development. 2016. *National Energy Policy and Energy Action Plan*, Majuro.

¹⁰ The design and monitoring framework is in Appendix 1.

¹¹ Project Administration Manual (accessible from the list of linked documents in Appendix 2).

20. The government has requested a grant not exceeding \$2 million from ADB's Special Funds resources (Asian Development Fund) to help finance the project. The Ministry of Finance of the RMI will provide the funds to MEC under a subsidiary grant agreement.

21. The summary financing plan is in Table 2. ADB will finance expenditures related to the AMI, supervising consultants, capacity building, and business-process-reengineering consultants. The government will finance taxes and duties on imported components for the project, and provide an in-kind contribution in the form of MEC equipment and labor to support installation of the AMI.

Table 2: Summary Financing Plan

Source	Amount (\$ million)	Share of Total (%)
Asian Development Bank Grant		
Special Funds resources (ADF grant)	2.000	89.0
Government	0.247	11.0
Total	2.247	100.0

ADF = Asian Development Fund
Source: Asian Development Bank

E. Implementation Arrangements

22. The Ministry of Finance will be the executing agency. MEC will be the implementing agency. ADB and the government have agreed on the formation of a project steering committee that will be chaired by the Combined Utilities Board chairman, and will comprise the director of the Ministry of Finance's Division of International Development Assistance, the national energy planner of the Ministry of Resources and Development, the minister of public works, an ADB project officer and ADB's development coordination officer. MEC's chief executive officer and chief technical officer will be supported by consultants to be appointed under the project to manage its implementation. The Project Administration Manual describes implementation arrangements in further detail.

Table 3: Implementation Arrangements

Aspects	Arrangements		
Implementation period	January 2018–January 2020		
Estimated completion date	January 2020		
Estimated grant closing date	July 2020		
Management			
(i) Oversight body	PSC comprising Combined Utilities Board, Ministry of Finance, Ministry of Resources and Development, Ministry of Public Works, and ADB		
(ii) Executing agency	Ministry of Finance		
(iii) Key implementing agencies	MEC		
(iv) Implementation unit	MEC chief technical officer		
Procurement	International competitive bidding	1 contract	\$1.4 million
Consulting services	QCBS and ICS	26 person-months	\$0.7 million
Advance contracting	MEC intends to begin solicitation of expressions of interest for ICB and consulting services prior to grant effectiveness; no contractual obligations will be created prior to grant effectiveness.		
Disbursement	The grant proceeds will be disbursed in accordance with ADB's Loan Disbursement Handbook (2017, as amended from time to time) and detailed arrangements agreed upon between the government and ADB		

ADB = Asian Development Bank, ICS = Individual Consultant Selection, MEC = Marshalls Energy Company, PSC = project steering committee, QCBS = Quality and Cost-Based Selection
Source: Asian Development Bank

23. The government has requested ADB assistance in selecting capacity-building and business-process-reengineering consultants because the government and MEC lack experience in selecting such consultants. Contracts will be between MEC and the consultants. Per ADB's Guidelines on the Use of Consultants (2013), paras. 2.30 and 2.31, and on the advice of OSFMD, ADB may select consultants for capacity-building and business-process-reengineering consultants under a single-source-selection, using the same consultants retained to perform precisely the same services under project 49450-010, Capacity Building and Sector Reform for Renewable Energy Investments in the Pacific.

III. DUE DILIGENCE

A. Technical

24. The project has been assessed to be technically viable. An advanced metering infrastructure (AMI) consists of standard modern customer revenue metering equipment, paired with standard industry metering equipment and standardized software solutions. For the AMI field equipment, proposed components are readily available and easily replaceable. For the AMI center equipment, standardized communication and computer equipment are proposed. All physical components are proposed having in mind the harsh humid and saline environment in RMI. A more sophisticated and expensive metering system with higher-frequency data sampling was also considered, but deemed excessive for MEC's requirements. Thorough training of MEC personnel and ample spare parts will be included in the contract to ensure long-lasting operation of the AMI system. The technical analysis indicates that the proposed investment is best as it is simple to implement and has strategic value relating to MEC revenue and cost management, and also enables prudent planning of future investments in the Majuro power network.

B. Economic and Financial

25. In the base case scenario, the economic internal rate of return is estimated at 10.6% (including greenhouse gas emission reduction benefits), exceeding the hurdle rate of 9%. The economic net present value is positive at \$0.169 million. The project is considered economically viable. Sensitivity analysis of the economic internal rate of return and the economic net present value was conducted under the following scenarios: (i) increase in capital costs by 10%, (ii) increase in operation & maintenance (O&M) costs by 10%, (iii) reduction of benefits (such as decreased network losses and carbon value) by 10%, and (iv) increase in capital costs by 20% combined with loss reduction (fuel saving) by only 3%.

26. The project is most sensitive to a lower-than-expected reduction in network losses, and is least sensitive to changes in O&M costs. The results of the sensitivity analysis indicate that the project is resilient to adverse impacts affecting key risk parameters.

27. The financial internal rate of return of the project is 15.2% and the financial net present value is \$3.3 million when discounted at the weighted average cost of capital of 1%. This indicates that the project is financially viable. Sensitivity analysis conducted through a number of scenarios, including an increase in capital costs, an increase in O&M costs, a reduction of benefits, and a combination of all adverse impacts, demonstrates that the project remains financially viable.

C. Governance

28. ADB conducted a financial management assessment for the implementing agency, MEC. Overall inherent risk has been assessed as moderate. The 2012 Public Expenditure and Financial

Accountability (PEFA) assessment identified several country-level public financial management risks. Entity-level inherent risks have been assessed as moderate and project level inherent risks are assessed as low since it is a straightforward project with a short completion period, and will be supported by external consultants. The overall control risks have been assessed as moderate. MEC's procurement processes are consistent with ADB requirements, and represent a low procurement risk. However, with respect to selection of consultants to provide capacity-building and business-process reengineering services, MEC's and government's technical capacity to assess consultants' technical offers is inadequate; the government has requested ADB assistance in the selection of these consultants.

29. The financial management assessment identified risks that will require mitigation measures. These risks pertain to the MEC's incomplete asset base, as recorded in its financial statements; MEC's long outstanding receivables, including many from government entities; outstanding MEC dues to the government; owed electricity supplies that have yet to be delivered to landowners on whose land MEC assets are located; and opacity in fuel pricing.

30. ADB's Anticorruption Policy (1998, as amended to date) was explained to and discussed with the government and the Ministry of Finance. The specific policy requirements and supplementary measures are described in the project administration manual.

D. Poverty, Social, and Gender

31. The impact of the overall project will be, all else being equal, a reduction in cost of electricity service to Majuro's economy and population through: (i) a decrease in technical and non-technical losses in the Majuro distribution system; (ii) a better understanding of distribution system performance, leading to improved service reliability; (iii) reduced consumption of imported fossil fuels; and (iv) improved management and governance arrangements at MEC.

32. Reducing the cost of power to MEC's customers and increasing MEC's efficiency, sustainability, and reliability, will have obvious social benefits, including reduction in household expenditures on power service, freeing resources for other consumption choices. Reduced power costs for businesses served by MEC will improve businesses' profitability and productivity, and can be expected to increase economic activity on Majuro. Improved service reliability will impact quality of life generally on Majuro, and to produce other positive impact in the quality of public services (e.g. health, education, public safety, etc.)

33. The project has no gender elements given its limited potential to mainstream gender in its scope. It is not expected to deliver any direct or tangible benefits to women and girls.

E. Safeguards

34. In compliance with ADB's Safeguard Policy Statement (2009), the project's safeguard categories are as follows.¹²

35. **Environment (category C).** The project has been classified as category C for environment following ADB's Safeguards Policy Statement. The project involves minor augmentation of existing infrastructure and will not disturb natural habitat or physical cultural resources. No existing infrastructure will be removed and no significant waste will be generated. Minimal or no adverse impacts are anticipated.

¹² ADB. Safeguard Categories. <https://www.adb.org/site/safeguards/safeguard-categories>.

36. **Involuntary resettlement and indigenous peoples (category C).** The project has been classified as category C for involuntary resettlement following ADB's Safeguard Policy Statement. The project does not involve land acquisition or resettlement and does not involve physical or economic displacement of people or structures. The government has formally acquired utility easements in the 1970s. However, as the easements were described by reference to the centerline of the paved surface of the road, they would have moved from the original position along with the movements of the paved surface of roads over time. Nevertheless, project due diligence confirmed that government use of and compensation for existing easements has been carried out in ways acceptable and beneficial to landowners and consistent with the requirements and mandates of local laws. The installation of metering devices under the project will not require additional land and will only take place on sites where there are no outstanding issues in relation to involuntary land acquisition and resettlement.

37. **Indigenous peoples (category C).** The project has been classified as category C for indigenous peoples following ADB's Safeguard Policy Statement as there will be no impact on distinct and vulnerable indigenous peoples.

F. Summary of Risk Assessment and Risk Management Plan

38. Significant risks and mitigating measures are summarized in Table 4 and described in detail in the risk assessment and risk management plan.¹³

Table 4: Summary of Risks and Mitigating Measures

Risks	Mitigation Measures
Low understanding of the new AMI systems leading to improper operation, maintenance, and data analysis	MEC to provide personnel capable of handling computer systems and troubleshooting communications. Supplier to provide adequate training for proper (i) operation, (ii) maintenance, and (iii) analysis of gathered data resulting in operation action. Supervising consultant to report adequacy of the initial training, to recommend changes before commissioning stage, and assess final MEC AMI knowledge capacity before project closure.
Lack of local smart metering standards leading to suboptimal quality installations	Tendering documents will be assembled following internationally accepted standards. Supplier will then provide training to MEC personnel on required standard of AMI installations. Finally, supervising consultants will ensure that international standards are followed.
MEC has no internal audit function. Very difficult to recruit skilled internal auditors. Constraint on verification of use of project resources.	ADB TA consultant support will be provided to monitor and report on use of project resources; scope of review and recommendations by consultants under Output 2 of project will include financial management.

ADB = Asian Development Bank, TA = technical assistance, AMI = advanced metering infrastructure, MEC = Marshalls Energy Company
Source: Asian Development Bank

IV. ASSURANCES

39. The government and MEC have assured ADB that implementation of the project shall conform to all applicable ADB policies, including those concerning anticorruption measures,

¹³ Risk Assessment and Risk Management Plan (accessible from the list of linked documents in Appendix 2).

safeguards, gender, procurement, consulting services, and disbursement as described in detail in the project administration manual and loan documents.

40. The government has agreed with ADB on certain covenants for the project, which are set forth in the draft grant agreement and project agreement.

V. THE PRESIDENT'S DECISION

41. The President, acting under the authority delegated by the Board through the approval of the Pacific Renewable Energy Investment Facility, has approved the grant not exceeding \$2,000,000 to the Republic of Marshall Islands from ADB's Special Funds resources (the Asian Development Fund), for the Majuro Power Network Strengthening Project, on terms and conditions that are substantially in accordance with those set forth in the draft grant and project agreements.

DESIGN AND MONITORING FRAMEWORK

Impact(s) the Project is Aligned with			
The impacts will be (i) reduced dependence on imported fossil fuels, (ii) supply-side losses reduced, (iii) renewable electricity generation increased. ^a			
Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting	Risks
Outcome	By 2021		
MEC's consumption of diesel fuel for power generation reduced	a. MEC's Majuro power generation requirement reduced to 51.5 GWh (2016 baseline: 53.7 GWh). b. MEC's Majuro network losses reduced to 16%. (2010 baseline: 20%).	a. MEC generation output reporting. b. Transformer meter consumption data and generation output reporting.	Low understanding of the new AMI systems leading to improper operation, maintenance and data analysis
Outputs	By 2020		
1. AMI on the Majuro distribution network	1a. AMI installed and functioning at MEC's distribution transformers (numbering approximately 500); (baseline 2017 = zero). 1b. MEC staff trained on use and application of Advanced Metering Infrastructure (of which four female) (baseline 2017 = zero).	Implementation consultants' reports and MEC contract implementation and commissioning reports.	Low capacity of local MEC electrical crews resulting in suboptimal quality installations.
2. MEC business-process-reengineering and management-improvement action plans	Recommendations presented for MEC Board of Directors and Government adopted.	Consultant reporting and contract deliverables.	Risk of fraud or corruption within EA; MEC has no internal audit function. Very difficult to recruit skilled internal auditors. Constraint on verification of use of project resources.

Key Activities with Milestones

1. Advanced Metering Infrastructure on Majuro distribution network

- 1.1 Procurement package (ICB) for AMI produced by project preparation consultants (October 2017)
- 1.2 Advance procurement action IFB issued by MEC (November 2017)
- 1.3 AMI and supervision consultant contracts awarded (March 2018)
- 1.4 MEC commissions AMI (January 2020)

Key Activities with Milestones
<p>2. MEC business-process-reengineering and management-improvement action plans</p> <p>2.1 Advance procurement action IFB issued by ADB (November 2017)</p> <p>2.2 Consultant contract awarded (February 2018)</p> <p>2.3 Consultants mobilized (March 2018)</p> <p>2.3 Consultant analyses, recommendations, and business-process-reengineering and management-improvement plans presented (September 2018)</p>
<p>Inputs</p> <p>ADB (ADF): \$2.000 million</p> <p>Government: \$0.247 million (in-kind)</p>
<p>Assumptions for Partner Financing</p> <p>Not Applicable</p>

ADB = Asian Development Bank, ADF = Asian Development Fund, AMI = Advanced Metering Infrastructure, GWh = gigawatt-hour, ICB = international competitive bidding, IFB = invitation for bids, MEC = Marshalls Energy Company
^a Ministry of Resources and Development. 2016. *National Energy Policy and Energy Action Plan*, Majuro.
Source: Asian Development Bank.

LIST OF LINKED DOCUMENTS

<http://www.adb.org/Documents/RRPs/?id=49450-007-2>

1. Grant Agreement
2. Project Agreement
3. Sector Assessment (Summary): Energy
4. Project Administration Manual
5. Contribution to the ADB Results Framework
6. Development Coordination
7. Financial Analysis
8. Economic Analysis
9. Country Economic Indicators
10. Summary Poverty Reduction and Social Strategy
11. Risk Assessment and Risk Management Plan