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Report No: PADHI00711

INTERNATIONAL DEVELOPMENT ASSOCIATION

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED GRANT
IN THE AMOUNT OF SDR 32.3 MILLION
(US$42 MILLION EQUIVALENT)

TO THE
FEDERATED STATES OF MICRONESIA

FOR A

ACCESS AND RENEWABLE INCREASE FOR SUSTAINABLE ENERGY PROJECT
(P181253)

AS PHASE 3 OF THE MULTI-PHASE PROGRAMMATIC APPROACH

ACCELERATING SUSTAINABLE ENERGY TRANSITION PROGRAM

WITH AN OVERALL FINANCING ENVELOPE OF US$2,500 MILLION
APPROVED BY THE BOARD ON SEPTEMBER 24, 2024

March 19, 2025

Energy & Extractives Global Practice
East Asia and Pacific Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective January 31, 2025)

SDR1 =	US$1.30383
US$1 =	SDR0.76697

FISCAL YEAR
January 1 - December 31

Regional Vice President:	Manuela V. Ferro
Regional Director:	Sudeshna Ghosh Banerjee
Country Director:	Stephen N. Ndegwa
Practice Manager:	Jie Tang
Task Team Leader:	Alain Ouedraogo

ABBREVIATIONS AND ACRONYMS

ACE	ASEAN Centre for Energy
ADB	Asian Development Bank
AM	Accountability Mechanism
AMU	Association of Micronesian Utilities
ARISE	Access and Renewable Increase for Sustainable Energy
ASEAN	Association of Southeast Asian Nations
BESS	Battery Energy Storage System
CIU	Central Implementation Unit
CPF	Country Partnership Framework
CPUC	Chuuk Public Utility Corporation
DA	Designated Account
DECEM	Department of Environment, Climate Change and Emergency Management
DFAT	Department of Foreign Affairs and Trade
DoFA	Department of Finance and Administration
DoR&D	Department of Resources and Development
EAP	East Asia and Pacific
EBITDA	Earnings Before Interest, Taxes, Depreciation, and Amortization
EIRR	Economic Internal Rate of Return
E&S	Environmental and Social
EMP	Energy Master Plan
ENPV	Economic Net Present Value
EPC	Engineering, Procurement, and Construction
ESCP	Environmental and Social Commitment Plan
ESDP	Energy Sector Development Project
ESMF	Environmental and Social Management Framework
ESS	Environmental and Social Standard
EU	European Union
FIDIC	International Federation of Consulting Engineers
FIRR	Financial Internal Rate of Return
FM	Financial Management
FNPV	Financial Net Present Value
FSM	Federated States of Micronesia
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GIS	Geographic Information System
GoFSM	Government of Federated States of Micronesia
GRM	Grievance Redress Mechanism
GRS	Grievance Redress Service
HEIS	Hands-on Expanded Implementation Support
IBRD	International Bank for Reconstruction and Development
IDA	International Development Association
IPF	Investment Project Financing
KUA	Kosrae Utilities Authority
KWh	Kilowatt hour
MFD	Maximizing Finance for Development
MPA	Multi-Phase Programmatic Approach

MW	Megawatt
NAP	National Adaptation Plan
NDC	Nationally Determined Contribution
NEP	National Energy Policy
NEW	National Energy Workgroup
OHS	Occupational Health and Safety
PAD	Project Appraisal Document
PDO	Project Development Objective
PICs	Pacific Island Countries
PIM	Project Implementation Manual
PIU	Project Implementation Unit
PrDO	Program Development Objective
PUC	Pohnpei Utilities Corporation
PV	Photovoltaics
PWIP	Pacific Women's Energy Employment and Empowerment Program (known as PWIP)
REDP	Renewable Energy Development Project
REGAIN	Renewable Energy Generation and Access Increase
RMI	The Republic of the Marshall Islands
RVP	Regional Vice President
SAIDI	System Average Interruption Duration Index
SCADA	Supervisory Control and Data Acquisition
SEDAP	Sustainable Energy Development and Access Project
SEP	Stakeholder Engagement Plan
SHS	Solar Home Systems
UNDP	United Nations Development Programme
US	the United States
YSPSC	Yap State Public Service Corporation

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DATASHEET

BASIC INFORMATION

Project Beneficiary(ies)	Operation Name		
	Access and Renewable Increase for Sustainable Energy Project		
Operation ID	Financing Instrument	Environmental and Social Risk Classification	
P181253	Investment Project Financing (IPF)	Moderate	

Financing & Implementation Modalities

[✓] Multiphase Programmatic Approach (MPA)	[ ] Contingent Emergency Response Component (CERC)
[ ] Series of Projects (SOP)	[✓] Fragile State(s)
[ ] Performance-Based Conditions (PBCs)	[✓] Small State(s)
[ ] Financial Intermediaries (FI)	[ ] Fragile within a non-fragile Country
[ ] Project-Based Guarantee	[ ] Conflict
[ ] Deferred Drawdown	[ ] Responding to Natural or Man-made Disaster
[ ] Alternative Procurement Arrangements (APA)	[✓] Hands-on Expanded Implementation Support (HEIS)

Expected Approval Date	Expected Closing Date	Expected Program Closing Date
21-Mar-2025	27-Feb-2031	31-May-2034
Bank/IFC Collaboration		
No		

MPA Program Development Objective

To accelerate the scale-up and grid integration of renewable energy in participating countries across the East Asia and Pacific region.

MPA FINANCING DATA (US$, Millions)

MPA Program Financing Envelope	2,517.20
with a reduction of IBRD	175.00
with a reduction of IDA	143.00

Proposed Development Objective(s)

The Project development objective is (i) to increase access to electricity, (ii) improve the reliability of electricity service, and (iii) increase renewable energy generation in targeted Project areas.

Components

Component Name	Cost (US$)
Electricity Service Expansion	27,000,000.00
Renewable Energy Generation	9,480,000.00
Institutional Strengthening and Implementation Support	5,520,000.00

Organizations

Borrower:	Federated States of Micronesia
Implementing Agency:	Department of Resources and Development (DoR&D)

MPA FINANCING DETAILS (US$, Millions)

Board Approved MPA Financing Envelope	**2,517.20**
MPA Program Financing Envelope:	2,517.20
of which Bank Financing (IBRD):	1,900.00
of which Bank Financing (IDA):	600.00
of which Other Financing sources:	17.20

PROJECT FINANCING DATA (US$, Millions)

Maximizing Finance for Development

Is this an MFD-Enabling Project (MFD-EP)?	Yes
Is this project Private Capital Enabling (PCE)?	No

SUMMARY

Total Operation Cost	**42.00**
Total Financing	**42.00**
of which IBRD/IDA	**42.00**
Financing Gap	**0.00**

DETAILS

World Bank Group Financing

International Development Association (IDA)	42.00
IDA Grant	42.00

IDA Resources (US$, Millions)

	Credit Amount	Grant Amount	SML Amount	Guarantee Amount	Total Amount
National Performance-Based Allocations (PBA)	0.00	42.00	0.00	0.00	42.00
Total	**0.00**	**42.00**	**0.00**	**0.00**	**42.00**

Expected Disbursements (US$, Millions)

WB Fiscal Year	2025	2026	2027	2028	2029	2030	2031
Annual	0.90	2.50	3.00	5.85	10.50	10.00	9.25
Cumulative	0.90	3.40	6.40	12.25	22.75	32.75	42.00

PRACTICE AREA(S)

Practice Area (Lead)

Energy & Extractives

Contributing Practice Areas

CLIMATE

Climate Change and Disaster Screening

Yes, it has been screened and the results are discussed in the Operation Document

SYSTEMATIC OPERATIONS RISK- RATING TOOL (SORT)

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

POLICY COMPLIANCE

Policy

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

[ ] Yes [✓] No

Does the project require any waivers of Bank policies?

[ ] Yes [✓] No

ENVIRONMENTAL AND SOCIAL

Environmental and Social Standards Relevance Given its Context at the Time of Appraisal

E & S Standards	Relevance

ESS 1: Assessment and Management of Environmental and Social Risks and Impacts	Relevant
ESS 10: Stakeholder Engagement and Information Disclosure	Relevant
ESS 2: Labor and Working Conditions	Relevant
ESS 3: Resource Efficiency and Pollution Prevention and Management	Relevant
ESS 4: Community Health and Safety	Relevant
ESS 5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	Relevant
ESS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	Relevant
ESS 7: Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities	Not Currently Relevant
ESS 8: Cultural Heritage	Not Currently Relevant
ESS 9: Financial Intermediaries	Not Currently Relevant

NOTE: For further information regarding the World Bank's due diligence assessment of the Project's potential environmental and social risks and impacts, please refer to the Project's Appraisal Environmental and Social Review Summary (ESRS).

LEGAL

Legal Covenants

Sections and Description
Schedule 2 - Section I - A 4 (a) - Project Implementation Unit: the Recipient shall at all times during the implementation of the Project, maintain a Project Implementation Unit ("PIU") within the DoR&D, with mandate, composition and resources acceptable to the Association, to be responsible for, inter alia, overall implementation of the Project, including procurement, monitoring and evaluation, and environmental and social management.
Schedule 2 - Section I - A 3 - Central Implementation Unit: The Recipient shall maintain throughout Project implementation, the Central Implementation Unit with a mandate, composition and resources satisfactory to the Association, which shall: (a) be responsible for financial management for the Project, and (b) provide implementation support related to procurement, environmental and social management, monitoring and evaluation and communications for the Project.
Schedule 2 - Section I - C 1 - Project Implementation Agreement: The Recipient shall, prior to the carrying out of any Project activities in a Recipient's State, enter into and thereafter maintain throughout the Project implementation period, a Project Implementation Agreement with each State Government and State Power Utility of such State on terms and conditions satisfactory to the Association, which shall include, inter alia, the State Government's obligation to facilitate the implementation of the Project activities within its territory in accordance with the provisions of this Agreement, the Project Implementation Manual and the Environmental and Social Commitment Plan ("ESCP").
Schedule 2 - Section I - A 4 (c) - Project Implementation Unit Staff Recruitment: the Recipient shall, without limitation to the generality of the foregoing, recruit by no later than three (3) months after the Effective Date: (i) a local Project assistant; (ii) an electrical engineer; and (iii) a procurement officer; and by no later than six (6) months after the

Effective Date, recruit an environment and social development officer; each with qualifications, experience and terms of reference satisfactory to the Association.

Conditions

Type	Citation	Description	Financing Source
Disbursement	Financing Agreement - Schedule 2 - Section III.B.1 (b)	No withdrawal shall be made for Eligible Expenditures under Category (2), until and unless the Association has notified the Recipient that the conditions set forth in Section 5.15 (a) of the General Conditions have been fulfilled.	IBRD/IDA
Disbursement	Financing Agreement - Schedule 2 - Section III.B.1 (c)	No withdrawal shall be made for Complementary Financing for the Cat DDO under Category (3), until and unless (i) the Recipient has furnished to the Association a request to reallocate and thereafter withdraw all or part of the Unwithdrawn Credit Balance for the Complementary Financing for the Cat DDO, and such notice specifies the Cat DDO Legal Agreement; and (ii) the Association has accepted said request and notified the Recipient thereof, and is satisfied, based on evidence satisfactory to it, that the conditions precedent to withdrawal of the financing provided under the Cat DDO Legal Agreement have been fulfilled.	IBRD/IDA

I. STRATEGIC CONTEXT

1. This Project Appraisal Document (PAD) presents Phase 3 of the Accelerating Sustainable Energy Transition Program under the Multi-Phase Programmatic Approach (MPA). Phase 1 of the MPA was approved by the World Bank's Executive Directors on September 24, 2024 (P181555, Report No. PAD 5623) with an overall financing envelope of US$2.5 billion for the six East Asia and Pacific (EAP) countries listed under the MPA. The Program was declared effective on October 29, 2024. Soon after, Phase 2 of the MPA Program was approved by the Regional Vice President (RVP) on November 13, 2024. Phase 3 is proposed to benefit the Federated States of Micronesia (FSM). The proposed IDA grant of US$42 million for Phase 3 does not exceed the approved Program envelope.

A. Project Strategic Context

2. The Project targets the energy sector of the Federated States of Micronesia, a dispersed archipelagic nation in the western part of the North Pacific Ocean. FSM comprises over 600 islands stretching 2,700 kilometers from west to east and grouped into four semi-autonomous states: Pohnpei, Chuuk, Yap, and Kosrae. Each of the four states consists of a main island surrounded by numerous outer islands, except Kosrae. In 2022, 47 percent of the population of FSM (about 114,164 people) lived in Chuuk, 35 percent in Pohnpei, 11 percent in Yap, and 7 percent in Kosrae. Though women make up a significant share of the population, they participate to a much lesser extent to the labor force (32.5 percent for women and 67.8 percent for men aged 15 and over) and face higher unemployment (13.9 percent unemployment rate for women compared to 5.4 percent for men).[1] While each state has its own executive and legislative bodies, the national government, based in Pohnpei, is responsible for setting national directives and visions (coordinating functions among the states) and for international relations. Electricity service is unreliable in the main islands of each state. In Chuuk State, 40 inhabited islands (out of a total of 42 islands)—over half of the state's households—have no electricity service. The Government of FSM (GoFSM) has set the goal of universal electricity access by 2030. The Project will directly contribute to achieving the Government's electricity access goal by increasing the rate of electrification in Chuuk and improving the reliability of electricity service in main islands.

3. The Project will support FSM's economy and help the country mitigate, and become more resilient to, climate change impacts. According to the International Monetary Fund 2023 Article IV, FSM's economic growth was estimated to have averaged zero percent in FY2022-2023, and inflation reached a decade high 6.2 percent driven by higher import prices for fuel and food, as well as supply bottlenecks. FSM's economy remains highly vulnerable to shocks, such as an increase in global commodity prices, labor shortages (outward migration), and extreme climate events, including typhoons, rising sea level, coastal erosion, and landslides. The Global Climate Risk Index[2] ranked FSM as the 5th most at-risk country amongst peers in the Pacific Island Countries (PICs) over the 1993-2022 period. Recognizing the challenge, the GoFSM, through its 2022 updated Nationally Determined Contribution (NDC) to climate change, committed to significantly increasing the share of renewable energy generation . In this context, the Project will increase integration and enhance power grid resilience, which together will mitigate climate change (reducing greenhouse gas (GHG) emissions), lessen the reliance on costly imported fossil fuel for power generation (reducing the negative impact on the economy), and help targeted communities become more resilient.

[1] UN Women: Gender Equality Brief for Federated States of Micronesia - https://asiapacific.unwomen.org/sites/default/files/2022-12/UN_WOMEN_FSM.pdf

[2] Lina Adil, David Eckstein, Vera Kunzel, Laura Schafer: Global Climate Risk Index 2025 - Who Suffers Most from Extreme Weather Events? Weather-Related Loss Events in 2022 and 1993-2022. February 2025 https://www.germanwatch.org/sites/default/files/2025-02/Climate%20Risk%20Index%202025.pdf

B. Sectoral and Institutional Context

Institutional context

4. The Department of Resources and Development (DoR&D), through its energy and water division, is responsible for the energy sector development, coordination, and program implementation. DoR&D comprises divisions that oversee several sectors: Energy and Water, Marine Resource, Trade and Investment, Agriculture, Statistics, and Tourism. The Energy and Water Division is responsible for developing and implementing national energy policies, programs, and projects in coordination with State Governments and acts as a coordinator with regional and international counterparts. The main coordination mechanism on energy, between the national and state governments, is undertaken through the National Energy Workgroup (NEW), a platform chaired by the Department's Secretary that brings together key national departments, the Office of Development Assistance, state-level energy workgroups, and state power utilities, to oversee all national efforts in the energy sector, including reviewing progress on the implementation of the energy policy and programs/projects, and coordinating overseas development assistance. The Division implements programs and projects through dedicated project implementation units (PIUs) with support from the Department of Finance and Administration (DoFA), which hosts a Central Implementation Unit (CIU) that provides support on financial management (FM), environmental and social (E&S) aspects, and procurement for all World Bank-financed projects. DoR&D's Energy and Water Division also liaises with the Department of Environment, Climate Change, and Emergency Management (DECEM) on climate change mitigation, adaptation, and disaster management.

5. The 2018 national and states Energy Master Plan (EMP), 2022 NDC, and 2024-2050 National Energy Policy (NEP) provide the energy sector plans and goals. The national and state's EMPs, developed under the World Bank-financed Energy Sector Development Project (P148560, closed on September 2019) and adopted by the GoFSM in April 2018, provide a 20-year roadmap and investment requirements on energy infrastructure for each state. The EMP also provides a clear focus on empowering women mainly through energy provision and improving health outcomes. The EMP has informed the development of FSM's NDC. In 2022, the FSM submitted its updated NDC goals[3] which include updated energy sector targets: By 2030, to (i) reach universal electricity access (100 percent) nationwide, (ii) increase electricity generation from renewable energy to more than 70 percent of total generation, and (iii) reduce carbon dioxide emissions from electricity generation by more than 65 percent below 2000 level. Recently, in 2024, FSM updated its 2012 NEP. The 2024-2050 NEP, endorsed by the Government in August 2024, highlights the national energy vision to improve the life and livelihood of all citizens with affordable, reliable, and environmentally sound energy. Thus, the NEP re-emphasizes the energy sector goals of FSM becoming less dependent on imported energy by meeting at least 70 percent of electricity generation from renewable energy and achieving 100 percent electrification (including the lagoon and outer islands) by 2030.

6. At the state level, power generation and supply are managed by state power, water, and sewerage operators—Chuuk Public Utility Corporation (CPUC), Pohnpei Utilities Corporation (PUC), Yap State Public Service Corporation (YSPSC), and Kosrae Utility Authority (KUA). The utilities were established by state laws between 1991 and 1996, and their board members are appointed by state governors. They are responsible for electricity, water, and sewerage services provision covering generation/production/collection, distribution, and commercialization in their respective states, and servicing together about 12,750 electricity customers in the FSM. The state power utilities operate on a commercial basis with their own tariff structures and rates, ranging from 37 to 55 US cents per kilowatt hour (kWh) on main islands[4], as detailed in Table 1. Tariffs are reviewed and approved by state governors in consultation with state legislature and utility boards. The four state utilities have together formed the Association of Micronesian Utilities (AMU), endorsed by the President in

[3] FSM submitted its first NDC to reduce GHG emissions by 30 percent by 2025.
[4] These are tariffs on the main islands. For outer islands, the tariffs charge is about US$1.08/kWh, significantly lower than supply costs which are more than US$5/kWh (especially in Yap).

2010, to provide a single organization to promote financial sustainability, facilitate international partnerships, and work more effectively with suppliers and other private sector players. Besides the four utilities, Vital, a state-owned enterprise formerly known as FSM petroleum corporation, is responsible for imports and sales of petroleum products in the four states. It supplies diesel to the state utilities for power generation. To help bridge the power supply deficit, Vital entered into a power purchase agreement with CPUC to provide 1.05-megawatt (MW) diesel-based generation on the island of Tonoas.

Table 1. FSM State Power, Water, and Sewerage Utilities

Utility	Establishing Law	Number of staff	Number of customers	Share of metered customers (%)	Tariff	
					Structure	**Residential** (US$/kWh)
CPUC	The CPUC act (1996)	107	2,599	100	Uniform per Island	0.5068 (Weno) 0.5508 (Tonoas)
PUC	State Law 2L-179-91 (1991)	150	7,648	100	Uniform	0.4826
YSPSC	State Law 4-4 (1995)	90	2,624	99	Tiered	0.371-0.450
KUA	State Law 5-38 (1991)	20	1,903	96	Tiered	0.428 - 0.471

Source: World Bank Team. The team gathered the information from the state power utilities' websites and reports. The table was reviewed and agreed upon by the power utilities.

Power sector overview and challenges

7. Reflecting the island configuration, FSM's power system landscape comprises four main grids in the four state main islands, and mini/micro grids in few outer islands. The Pohnpei main island grid—servicing 7,648 customers—is the largest, followed by the Yap main island grid with 2,624 customers, Weno island main grid (in the State of Chuuk) that supplies 2,600 customers, and the Kosrae grid (around 2,000 customers). Besides the main grids, mini or micro grids are operational in seven Yap outer islands (two diesel-powered and five solar-powered), and one outer island in Chuuk. Kosrae is a single atoll with no outer islands. With this power system, about 76 percent of all households in the FSM are estimated to have access to some form of electricity. The total installed (nameplate) power capacity is estimated at 42 MW, of which 36 MW (86 percent) are from diesel fuel power generation and 5.9 MW (14 percent) from various renewable sources (solar photovoltaics [PV], wind turbines, and hydropower). About 52 percent (19 MW out of 36 MW) of the installed diesel generation capacity is available, while the overall peak demand is currently estimated at 13.3 MW and expected to reach about 22 MW by 2030. At the state level, the available diesel generation capacity provides no generation margin to meet the peak load in Kosrae and Pohnpei. Table 2 presents key power sector data collected from state power utilities, national policies, and Pacific Islands' power sector benchmarking reports. The main challenges in the development of the FSM power sector include (i) the high dependence on diesel for power generation, (ii) the significantly low electricity access rate in Chuuk, (iii) the unreliable power supply in selected main grids coupled with weak climate resilience, and (iv) the relatively weak institutional capacity.

Table 2: Key Power Sector Data

State	Installed Diesel Capacity (MW)	Available Diesel Capacity (MW)	Installed RE Capacity (MW)	Available RE Capacity (MW)	Diesel fuel use (1,000 gallons)	Peak load (MW)	Peak load by 2030 (MW)	Access rate (%)	Total losses (%)	SAIDI (mins per customer)
Chuuk	7.6	5.2	0.66	0.59	1,117	2.8	4.2	33	17	31.8
Pohnpei	13.3	7.4	3.60	2.38	2,309	7.4[5]	12.9	94	27	1,787
Yap	11.5	5.2	1.33	0.78	746	1.9	3.3	87	19	980
Kosrae	4.0	1.2	0.35	0.35	515	1.2	1.5	98	15	1,716
Total	**36.4**	**19.0**	**5.94**	**4.1**	**4,687**	**13.3**	**21.9**	**76**		

Source: Data collected from Utility Chief Executive Officers, their websites, and annual reports. System Average Interruption Duration Index (SAIDI) data collected from both the utilities and the Pacific Power Associations' 2021 Benchmarking report. RE stands for renewable energy.

8. The country's high reliance on diesel raises energy security concerns and has led to high electricity tariffs. While FSM has made considerable efforts to increase the share of renewable energy in its power generation mix over the last decade, about 86 percent of the installed (nameplate) power generation capacity is based on diesel. The four utilities use about 4.6 million US gallons of diesel annually to run their power generators. Data collected from Vital indicates that the power sector is the second highest user of fuel, accounting for 36 percent of the imported fuels (with the transport sector being the top user). Annual expenditures on diesel imports for both power generation and transportation are estimated at around US$50 million in 2023, representing about 11 percent of Gross Domestic Product (GDP). The high reliance on imported diesel for power generation makes FSM's economy vulnerable to fuel price fluctuation and poses threats to its energy security. In addition, the dominance of diesel in power generation mix has led to FSM having the second highest residential electricity tariffs (after Solomon Power) in the PICs for average residential consumption of 100 kWh per month, according to the Pacific Power Association's 2021 benchmarking report. Residential electricity tariffs range from US$37 cent/kWh to 55 cent/kWh across the four states, with Chuuk's electricity tariffs in the Tonoas Island (US$55 cents/kWh) and Weno island (US$51 cents/kWh) being the highest in the FSM and Pohnpei (US$40 cent/kWh) and Yap (US$37 cent/kWh) having the lowest tariff. In the Pacific, Nauru Utility Corporation has the lowest tariff (US$12 cent/kWh) followed by Energy Fiji Limited (US$16 cent/kWh), whereas Solomon Power has the highest tariff (US$70 cent/kWh) for the same average consumption of 100 kWh per month.

9. Two thirds of Chuuk's households have no electricity service, while more than 85 percent of households in Yap, Pohnpei, and Kosrae have service. The national electricity access rate of 76 percent masks significant access disparities across states and between main and outer islands. The electricity access rate is currently estimated at 98 percent in Kosrae, 94 percent in Pohnpei, and 87 percent in Yap. Chuuk is lagging with an electrification access rate of 33 percent, though it has increased from 27 percent in 2018 due to the electrification of the Tonoas Island in 2022. Within Chuuk, the access rate varies significantly across islands. Only 2 of the 42 inhabited islands in Chuuk State are electrified—Weno, the capital city or main island and Tonoas—where access rate reaches 90 percent. Many outer islands (Inner Lagoon, Mortlocks, and Northwest) in Chuuk are unelectrified (without mini or micro grids), with very few facilities using solar home systems (SHS). The 2018 Energy Master Plan estimated that at least US$86 million of capital investments will be required to reach universal access in Chuuk, through the construction of over a dozen of mini grids in relatively concentrated settlements and the installation of over 1,500 stand-alone SHS for dispersed settlements. The World Bank-financed Sustainable Energy Development and Access Project (SEDAP) is financing the electrification of two islands (Udot/Eot and Satowan), whereas the Australian Department of Foreign Affairs and Trade (DFAT) is funding the electrification of three other islands (Fefen,

[5] The peak load in Pohnpei has increased to 7.4 MW from 6.4 MW in 2023. PUC is facing challenges in meeting the current demand and has requested the State government for emergency funding.

Piis Paneu, and Etten). Nonetheless, more needs to be done. The Chuuk State Energy Workgroup has prioritized the electrification of nine islands[6] and has been seeking donor funding.

10. A sizeable proportion of households with electricity connection receive unreliable electricity service due to aging power supply assets, inadequate maintenance, and extreme weather events. Though data reliability on unplanned and planned power outages needs to be improved across the Pacific, the main grids in Pohnpei and Kosrae experience some of the highest duration of power outages in both FSM and across the Pacific, with System Average Interruption Duration Index (SAIDI) averaging 1,700 customer minutes, over eight times the Pacific average of 200 customer minutes. The unreliable electricity service in both Pohnpei and Kosrae main grids is mainly due to aging network with dilapidated and/or slightly leaning wooden poles, corroded wooden cross arm, old insulators, and lack of sufficient equipment to manage vegetation (bucket/auger trucks). Also segments of the power infrastructure are located near the coastlines in low-lying areas and therefore, suffer from flooding, storm surge, corrosion, and high winds. Yap has experienced the highest number of category 3 typhoons in the FSM and the radial configuration of its distribution network—with very limited redundancy—has left critical facilities without power after storms. For instance, Typhoon Sudal knocked down the entire Yap main island network in 2004, leaving all customers without power for 21 days, whereas Typhoon Maysak damaged the Falalop's areal distribution network in 2015, leading to power outages for 28 days. Rehabilitating main island distribution networks to replace assets in poor condition, enhance resilience, and provide critical redundancy is critical to improve service reliability.

11. Capacity needs to be strengthened across the energy sector. Expertise on energy policy and regulation is lacking within the DoR&D's Energy Division, which has limited full-time staff and relies on external advisory services and consultants for program implementation and monitoring. As FSM plans to promote and leverage private sector investments to achieve its renewable energy generation targets, there is a critical need to build up a regulatory capacity, including developing, monitoring, and enforcing essential regulatory tools/mechanism. At the state level, utilities lack planning and design skills and have insufficient capacity to adequately maintain renewable energy technologies. PUC recently hired an electrical engineer. CPUC and YSPSC rely on one part-time electrical engineer. KUA has no electrical engineer. Three utilities (CPUC, YSPSC, and KUA) have no civil engineers. While CPUC has 14 certified technicians and Yap has eight certified technicians, only a few of these technicians are certified in maintenance of renewable energy technologies, including battery storage and control systems. Both PUC and KUA have no certified technicians. Across national and state levels, women's involvement in technical positions is very weak, and the sector needs to ramp up efforts to develop and attract female talent.

C. Multiphase Programmatic Approach

12. This PAD covers Phase 3 of the Accelerating Sustainable Energy Transition Program under the Multi-Phase Programmatic Approach (MPA), which includes several phases to be implemented over 10 years. Phase 1, approved on September 24, 2024, includes Papua New Guinea and the Republic of the Marshall Islands (RMI) alongside a technical assistance project implemented by the Association of Southeast Asian Nations (ASEAN) Centre for Energy (ACE). With Phase 1, the Board approved an overall financing envelope of US$2.5 billion for the six EAP countries listed under the MPA, including US$1.9 billion in IBRD financing and US$600 million in IDA financing. On October 29, 2024, the ACE grant became effective, thereby rendering the overall Program effective. Subsequently, the RMI Renewable Energy Generation and Access Increase (REGAIN) Project became effective on December 13, 2024. For Papua New Guinea, work is underway to expedite project effectiveness and initiate fiduciary and E&S activities. The proposed phasing has been determined in consultation with the respective Borrowers and reflects current level of readiness, political commitment, complementarities with ongoing interventions financed by other international financial institutions /donors as well as

[6] The prioritized islands include Moch, Onoun, Lekinoch, Polle, Nama, Nomwin, Houk, Uman, and Tol.

synergies and prioritization along key energy investments. Using this criteria, Phase 2 of the MPA, consisting of an IBRD loan of US$47 million for Mongolia, was approved by the RVP on November 13, 2024. A US$42 million IDA grant is being proposed as Phase 3 for the FSM, which will not exceed the approved Program envelope. Other operations in Cambodia and Indonesia are under preparation as future phases of the MPA. Please refer to Table 3 below for an updated Program Framework.

i. **Revised Program Development Objective (if any) and its Relevance**

13. The MPA's Program Development Objective (PrDO) remains relevant and unchanged for Phase 3. The PrDO of the MPA is to accelerate the scale-up and grid integration of renewable energy in participating countries across the EAP region. The aim is to enable the development of 2.5 gigawatts of renewable energy generation capacity, resulting in a net reduction of 60 million tons of CO_2 equivalent GHG emissions. To achieve its PrDO, the MPA activities are organized around three pillars: (i) Pillar One: Enabling policies and strengthened institutions; (ii) Pillar Two: Expanded and more flexible energy systems; and (iii) Pillar Three: De-risking clean energy investments.

ii. **Update on Program Results Chain and Key Program DO Indicators**

14. Similarly, the program results and development objective indicators are unchanged. The PrDO indicators include: (i) renewable energy capacity enabled with direct support, indirect support, and/or enabling policy support [MW]; and (ii) projected lifetime net GHG emissions from results achieved [metric tons of CO2eq]. Both indicators remain unchanged from Board approval and continue to be aligned with the World Bank Group Corporate Scorecard. Phase 3 is fully aligned with the Program's results chain and is expected to contribute about 2.7 megawatts of renewable energy generation capacity and approximately 107,000 metric tons of CO_2 emissions reduction, as presented in the Project's results framework. Additionally, the Project is expected to provide 32,000 people with new or improved access to electricity.

iii. **Updated Program Framework**

15. The MPA has been designed to address critical constraints to renewable energy deployment and is based on extensive and long-standing client engagement in the region. The MPA is intentionally designed with overlapping phases to ensure complementarity and incorporation of lessons and experience from preceding phases. Phases 1 and 2 of the Program are currently in initial stages of implementation (US$265 million in IDA financing and US$47 million in IBRD financing, respectively), while activities under Phase 3 are detailed in this PAD. Estimated financing for operations in subsequent phases under the MPA has been updated to reflect the latest discussions, while the overall financing envelope remains unchanged.

16. The total envelope for Phase 3 is US$42 million, all of which will be for FSM. In the Program PAD (P181555, Report No. PAD 5623)[7], the initial allocation for FSM was tentatively US$70 million in IDA financing. A final allocation of US$42 million was confirmed given availability of IDA financing, and the scope of the Project was adjusted accordingly. The revised scope for the US$42 million financing envelope is therefore reflected in this PAD. The Project remains relevant and will contribute to the achievement of the MPA objectives through activities that are aligned with the three MPA pillars. Aligned with the MPA pillar 1, the Project will increase the installed capacity of renewable energy generation (solar PV systems with battery energy storage and control systems) in the FSM thereby reducing reliance on and emissions from diesel generation. Consistent with the MPA pillar 2, the Project will upgrade transmission/distribution networks (including protection systems) to ensure adequate transfer of generated and future renewable power to customers. In line with the MPA pillar 3, the Project will contribute to de-risk clean energy investments from private sector by developing a regulatory framework that is conducive to private sector involvement, assisting in building up institutional regulatory capacity (as no dedicated regulatory agency exists), and supporting the adoption and implementation of cost recovery electricity tariffs

[7] Publicly disclosed information regarding the Program and Phase 1 is available here: https://documents1.worldbank.org/curated/en/099082024140036078/pdf/BOSIB16d1369c00f61bfa71a84f0a92dfe3.pdf

to improve power utilities' financial health, which will lower the risk of power purchase agreements with private developers.

iv. **Progress on the Learning Agenda**

17. The Project design incorporated lessons learned on technical, economic analysis and procurement aspects from the preparation of the MPA Phase 1 projects.

18. Technical Aspects: The preparation of the MPA Phase 1 projects emphasized the need to ensure grid stability in integrating renewable energy generation through inclusion of investment on battery energy storage system (BESS), controls, and grid enhancements. This lesson was included in the design of this Project by ensuring that adequate budget is earmarked not only for supply and installation of BESS and controls but also for grid enhancements and protection system upgrades.

19. Economic Analysis: The economic analysis of the Project built on and enhanced the economic analysis of the RMI REGAIN Project, a Phase 1 project of the MPA. The economic analysis of the RMI REGAIN Project provided a sound foundation for estimating benefits from renewable energy integration (generation cost savings and reduced CO_2 emissions), and reduced duration of power outages, which was used under this Project. Nonetheless, the REGAIN economic analysis fell short in estimating the benefits from enhanced resilience against climate and natural hazards. This knowledge gap was addressed in this Project by collecting more data from the utilities, defining, and applying an appropriate methodology in partnership with the Bank's Global Energy Unit. As a result, the economic analysis of the Access and Renewable Increase for Sustainable Energy (ARISE) Project included benefits from enhanced climate resilience.

20. Procurement Aspects: Procurement under both FSM ARISE (MPA Phase 3) and RMI REGAIN (MPA Phase 1) will leverage synergies to enhance competition and reduce costs, which could inform future MPA phases involving Pacific Island Countries. RMI and FSM face challenges in attracting international firms due to their remoteness and the small scope of the activities. Considering that both RMI REGAIN and FSM ARISE include similar activities—such as the supply of critical operational vehicles and the construction of mini grids in outer islands—the procurement for similar activities will be aggregated and launched simultaneously to attract more qualified bidders, which could lead to lower bid prices. This initiative, which represents the first pilot in PICs, will be monitored and analyzed. Lessons learned will be documented and shared with other PICs through the MPA Phase 1 ACE technical assistance platform and the annual Pacific Power Association forum. As several PICs face the same issue, the dissemination of the lessons learned from the pilot is expected to inform the implementation of the PNG National Energy Access Transformation Project (MPA Phase 1) as well as future MPA phases that would involve PICs.

Table 3: Updated Program Framework for the Accelerating Sustainable Energy Transition Program [Phase 3]

Phase	Project title and ID	Proposed PDO	Instrument	Estimated IBRD (US$, millions)	Estimated IDA (US$, millions)	Estimated Other Concessional/ Grant (US$, millions)	Estimated Approval Date	Estimated E&S Risk Rating
One	Clean Energy and Power Trade Development in SE Asia Project (P181555)	*Help accelerate renewable energy scale up in the ASEAN countries, including through regional power trade.*	IPF	–	5.00	–	September 24, 2024	Substantial
	Papua New Guinea: National Energy Access Transformation Project (P173194)	*Increase access to renewable energy and enhance the reliability of the electricity supply.*	IPF	–	200.00	4.20	September 24, 2024	Substantial
	Republic of the Marshall Islands: Renewable Energy Generation and Access Increase Project (P181250)	*(i) Increase renewable energy generation and (ii) improve the reliability and quality of electricity service in targeted main and outer islands.*	IPF	–	60.00	–	September 24, 2024	Moderate
Two	Mongolia: Third Energy Sector Project (P178190)	*increase the capacity and reliability of the transmission grid in the Project Areas for renewable energy integration.*	IPF	47.00	--		November 13, 2024	Moderate
Three	Federated States of Micronesia: Access Reliability Improvement and Sustainable Energy (P181253)	*Improve the reliability of electricity service, increase access, and enhance resilience of the power sector.*	IPF	–	42.00	–	Q3 FY25	Moderate
Later phases	Indonesia: Electricity Network Transformation Program (P180992)	*Increase the delivery and reliability of electricity supply and integrate distributed energy resources in the Java-Bali-Madura region.*	PforR	[500.00]	–	–	Q4 FY25	Moderate
	Indonesia: Sustainable Least-cost Electrification Program-2 (P501217)	*Increase access to sustainable electricity in the Kalimantan and Sumatra regions.*	PforR	[600.00]	–	[13.00]	Q4 FY25	Substantial
	Indonesia: Grid and Renewable Energy Financing Facility Guarantee	*Improve the electricity utility's capacity to raise Sustainability Linked Finance to accelerate Indonesia's energy transition.*	Guarantee	[753.00]	–	–	FY26	High
	Cambodia: Power Grid Strengthening Project (P508278)	*Support Cambodia in achieving its energy transition by promoting energy efficiency through supply and demand interventions*	IPF	–	[293.00]	–	FY26	[TBC]
Totals				[1,900.00]	[600.00]	[17.20]		
Grand Total				[**2,517.20**]				

II. PROJECT DESCRIPTION

A. Project Development Objective

21. The Project development objective (PDO) is (i) to increase access to electricity, (ii) improve the reliability of electricity service, and (iii) increase renewable energy generation in targeted Project areas.

B. PDO Indicators

22. The proposed PDO level results indicators are the following:

- People provided with new or improved access to electricity [number]
- Average reduction of unplanned power outages on the distribution networks in Pohnpei, Yap, and Kosrae [percentage]
- Renewable energy capacity enabled with direct support [MW]

C. Project Beneficiaries

23. Main Project beneficiaries include electricity consumers, the four power utilities, and key energy sector entities in FSM. Households, businesses, health care centers, and community facilities in selected islands of Chuuk will gain access to electricity through the construction and operationalization of mini grids. Residential, commercial, and government electricity users in the main islands of each state will receive more reliable and resilient electricity service resulting from rehabilitated distribution grids and supplied operational vehicles and goods for prompt recovery after climate/natural hazards. The state power utilities will benefit from increased revenues from generation fuel cost savings due to the integration of renewable energy systems, which will help improve financial viability of the utilities. The capacity of DoR&D's Energy Division will be enhanced through technical assistance on regulation, energy efficiency policy development, and program development.

D. Project Components

24. The proposed Project will contribute to the achievement of the GoFSM's energy sector goals by expanding (providing new or improved) access to electricity service, increasing renewable energy generation, and enhancing capacity of energy related entities in the four states of FSM. The Project will fund construction of mini grids, rehabilitation (including resilience enhancement) of distribution networks, integration of solar PV systems, technical assistance, and capacity strengthening. The proposed activities were drawn from FSM energy sector master plan investments, power utilities' priority plans, and studies/assessments funded by both the World Bank and other development partners. The implementation of the proposed activities is expected to result in increased electricity access in Chuuk State, more reliable and resilient electricity service in Pohnpei, Yap, and Kosrae, and enhanced renewable energy integration, leading to generation costs savings and less dependance on costly imported diesel fuels. Adding to SEDAP's expected electrification of two islands (Udot/Eot and Satowan) and 1 MW of installed solar capacity, the two successive World Bank-funded projects would together increase the access rate in Chuuk by roughly 15 percent and contribute to addition of renewable energy capacity totaling 4 MW in FSM. This would be a significant contribution to the achievement of FSM's access and renewable energy targets, and a relief from current heavy dependance on costly diesel generation. The Project activities are grouped into three components.

25. Component 1: Electricity Service Expansion (US$27 million) will (i) increase the electricity access rate in Chuuk; (ii) improve the reliability of power supply while enhancing resilience to climate and natural hazards and reducing technical losses in Pohnpei, Yap and Kosrae; and (iii) facilitate grid maintenance for the four power utilities. The Component comprises the following four sub-components:

- **Sub-Component 1.1 – Chuuk Islands Electrification (US$11.04 million)**– will implement the first major phase of outer islands electrification in the FSM, focusing on Chuuk, the state with the lowest electricity access rate. It will fund detailed studies, designs, supply, construction, supervision, and commissioning of solar powered mini grids and stand-alone solar home systems in four unelectrified Chuuk islands: Moch, Onoun, Tol-Wonip, and Uman. The islands were selected based on (i) land/rooftop availability, (ii) number of households, businesses, health care centers, schools, government facilities, (iii) ease of implementation, operation and maintenance (including accessibility), and (iv) geographic balance consideration between Inner Lagoon, Mortlocks, and Northwest Island groups. In each island, depending on the settlement patterns, solar-powered mini grids will be constructed and stand-alone solar home systems installed for households far from the mini grids. Each mini grid will comprise solar PV modules, BESS, distribution networks, service drops, and prepaid meters to provide electricity service to about 650 households, health care centers, schools, government and community facilities, and businesses. Minimal back-up diesel generation[8] (about 54 kW per island on average) will be provided to ensure reliable supply during peak hours. In addition, the sub-component will help complete the construction of solar-powered mini grids in Udot and Satowan (by enabling in-house electrical wiring), if uncompleted after the closing date of the SEDAP project. Also, a boat will be supplied to facilitate mini grid construction and maintenance. The Asian Development Bank (ADB) has agreed to promote productive uses of energy to enhance the financial viability of the grids' operation in the selected islands.

- **Sub-Component 1.2 – Pohnpei Grid Upgrade (US$7.23 million)**– will improve the automation, protection, resilience, and preventive maintenance of the distribution grid in Pohnpei main island. The subcomponent will install 10 nodal points in the distribution network[9], integrate Supervisory Control and Data Acquisition (SCADA) system along with fiber optic cables, and replace air switches by automated remote-controlled switches to enable automated operation and power flow monitoring.[10] It will install feeder protection relays in nodal points and automatic fault-detecting reclosers on several primary lines to reduce the duration of power outages. To enhance Pohnpei's grid's resilience and safety against high winds/heavy rains, the sub-component will replace i) aging primary wooden poles with concrete poles, ii) wooden cross arms with fiberglass ones, and iii) porcelain insulators with polymer ones in certain segments of the distribution network. In addition, it will provide PUC with a bucket/auger truck to facilitate preventive maintenance and accelerate power restoration following occurrence of natural and climate hazards.

- **Sub-component 1.3 - Yap Grid Resilience (US$6.52 million)**- will enhance the resilience of Yap main island distribution network. It will fund detailed designs, supply, supervision, and installation of three underground distribution feeders[11] to provide redundant and more reliable power to critical facilities—such as the Airport, hospital, water plant facilities, and the business center (where government buildings, the commercial center, and

[8] The feasibility study shows that 90 percent of renewable energy generation (with 10 percent of diesel generation) is the most reliable, stable, and cost-efficient option.

[9] The nodal points will significantly enhance grid stability and reliability because it will facilitate the efficient distribution of electricity by allowing for flexible routing based on changing demand patterns, ultimately improving the stability of the grid.

[10] This will enable automated operation and real-time power flow monitoring, further enhancing the grid's efficiency and responsiveness.

[11] The total length of feeders is about 25.63 km, comprising (i) the Airport feeder (7.02 km), the Colonia feeder (5.75 km), and the Northern feeder (12.86 km).

the radio station are located). The installation of underground distribution feeders will involve the laying out of electrical and fiber optic communication cables, and the installation of elevated pad-mounted transformers/switchgears, and remote-controlled/manual switching and reclosing equipment. To facilitate construction and operation, the sub-component will provide accessories (pipes, joints, conduits, junctions, termination kits); equipment for trenching, soil compacting, and road asphalt repair; and a bucket/auger truck. Overall, the sub-component will transform the current radial configuration of Yap main island distribution grid into a more resilient mesh network (with underground and aerial loops), which can withstand category 3 and above typhoons, thereby reducing significantly unplanned power interruptions that are due to the aerial grid vulnerability to strong winds and heavy rains.

- **Sub-component 1.4 – Kosrae Grid Rehabilitation (US$2.21 million)**– will rehabilitate segments of the distribution network, enable renewable energy storage, and facilitate preventive maintenance in Kosrae main island. The network rehabilitation will lead to a more climate-resilient network through (i) relocating power poles along erosive shoreline inland in the three main feeders of the distribution network to avoid potential storm surge and/or corrosive damage of power poles, thus maintaining a reliable delivery of electricity; and (ii) replacing dilapidated/aging wooden poles with concrete poles on certain segments on the distribution network which will lead to a substantial enhancement of climate resilience in the distribution of electricity against extreme weather events. The network rehabilitation will also enable the transfer of renewable energy, which the sub-component will support by funding the testing and commissioning of battery energy storage that was purchased and being installed under SEDAP. The subcomponent will also provide KUA with a bucket/auger truck for maintenance, tree pruning, and disaster restoration activities to facilitate more rapid network restoration, thus reducing the duration of power outages after high winds or storms.

26. Component 2: Renewable Energy Generation (US$9.48 million) will increase solar energy generation with storage and grid stability controls in Chuuk and Pohnpei to reduce diesel generation costs and help achieve GHG emission reduction targets. The installation of all solar PV systems will comply with hurricane/storm resilient standards and practices (e.g., strengthened bolting, vibration resistant materials). The component comprises two sub-components:

- **Sub-component 2.1 – Pohnpei Solar Energy Generation (US$5.50 million)** – will fund detailed studies, designs, supply, installation, commissioning, and supervision of grid-connected solar PV systems and enable its integration with the diesel-based generation assets in the Pohnpei island grid. 1.5 MW of solar PV systems will be installed on top of roofs of hangars at the Kolonia Sports Field (Government-owned site) along with 1.5 MWh of BESS, inverters, and transformers. From the Sports Field, a distribution line/feeder will be rehabilitated and associated protection systems upgraded to transfer the power generated to the Pohnpei island grid. To ensure adequate integration, monitoring, and management of generated renewable energy, the sub-component will fund the testing and commissioning of the SEDAP-purchased generation SCADA system to connect the added renewable system with existing hydropower and solar plants as well as the Nanpohnmal Power Plant's diesel generators, including the SEDAP-purchased diesel generators which are expected to be installed before the SEDAP closing date. The sub-component will also facilitate the testing/ troubleshooting (as part of the commissioning) of the SEDAP-purchased diesel generators to ensure adequate operation and renewable energy integration.

- **Sub-component 2.2 – Chuuk Solar Energy Generation (US$3.98 million)** – will fund detailed designs, supply, installation, commissioning, and supervision of grid-connected solar PV systems in the Chuuk's Weno grid and ensure grid stability. The installation of a total of 1.5 MW will be enabled. Of the 1.5 MW, 0.5 MW will be installed on rooftops of selected state-owned facilities (schools) and piloted for a few private hotels. The pilot for private facilities will involve technical assistance to develop and agree on a business model with private facility owners,

the application of the model for a few hotel owners, and documentation of lessons for replication. For the remaining 1 MW, the sub-component will enable its completion by providing technical assistance for the installation and commissioning of solar PV systems on top and canopies, technical room, and other facilities whose construction was initiated and advanced under SEDAP, but the installation cannot be done before the closing date. To enhance integration of renewable energy (considering the already existing 0.6 MW) and ensure grid stability in the Weno grid, the sub-component will install 2 MWh of BESS, with inverters and control systems and fund required protection upgrades.

27. **Component 3 - Institutional Strengthening and Implementation Support (US$5.52 million) -** aims to strengthen the capacity of key energy sector entities such as DoR&D, state power utilities, and the PIU. It consists of three sub-components:

Sub-component 3.1 – Sector Development Assistance (US$1 million)- will help strengthen key energy sector areas such as adoption of cost reflective electricity tariffs, regulatory capacity building, energy efficiency policy, and outer island electrification. It will assist state utilities and governing entities to implement action plans to adopt cost recovery tariffs for efficient utility operation. The action plans are being developed under a separate Bank advisory activity. The sub-component will help build up DoR&D's regulatory capacity through twinning arrangements with other regulatory agencies and the development of a regulatory framework that is conducive for private sector involvement. In addition, it will support DoR&D to develop an energy efficiency policy with an action plan to promote adoption and implementation of minimum performance standards for equipment. Also, the sub-component will fund feasibility studies for the electrification of remaining unelectrified outer islands with promotion of productive use.

- **Sub-component 3.2 - State Power Utility Capacity Strengthening (US$0.75 million)** – will seek to enhance the capacity of the four state power utilities on operation and maintenance of renewable energy technologies and distribution networks through a combination of an apprenticeship program that promotes women's employment, international technical expertise, and maintenance fund development. In collaboration with local (College of Micronesia) and regional education/training institutions, the World Bank-financed Skills and Employability Enhancement project (P176965), and the World Bank-implemented Pacific Women's Energy Employment and Empowerment Program (known as PWIP – P179022), the sub-component will fund an apprenticeship pilot—combining academic training (through a consultancy service contract with the College of Micronesia) with on-the-job training (through an individual consultant contract with a solar PV technician/expert) for an identified number of PUC, CPUC, KUA, and YSPSC staff to provide certified solar technicians, line technicians, and other required semi-skilled workers, with specific targets for female workers. The apprenticeship pilot's on-the job training will be strengthened by an internationally hired solar PV technician, who will be hosted under the AMU and will rotate for a certain period in each utility, to train local PUC, CPUC, KUA, and YSPSC staff on solar PV systems maintenance and operation. In addition, internships at the utilities will also be facilitated to help build a pipeline of skilled workforce. Also, utilities will be supported to establish and operationalize maintenance funds (through the development of the fund operational manual).[12] The capacity building activities will aim to increase women's involvement in the energy sector by (i) establishing a quota for the number of women in the apprenticeship and internship intakes (ii) developing and implementing gender policy and gender action plans specific to each utility, to attract and promote the retention of women (for example safety audit, hiring practices, mentorship). Collaboration with the World Bank's PWIP will drive action on closing gender gaps in women's employment and raising awareness on the importance of gender equality across PUC, CPUC, KUA, and YSPSC.

[12] The project will not fund the capitalization of the maintenance fund but will rather provide technical assistance to develop the operational manual of the fund.

- **Sub-component 3.3 - Project Implementation Support (US$3.77 million)** - will provide adequate resources to the DoR&D's PIU to execute the Project with support from the CIU[13] or CIU successor arrangement, on procurement, financial management, and environmental and social aspects. The sub-component will fund consulting and non-consulting services, goods, and operating costs to enable the PIU and CIU[14] to manage the Project over its duration. This will include salaries of (i) an international project manager, (ii) an international electrical engineer, (iii) a local procurement officer, (iv) a local environmental and social development officer and (v) a project assistant who will transition from SEDAP to ARISE. The sub-component will also fund environmental & social risk management activities, citizen engagement activities (including beneficiary surveys) covering the Components 1 and 2 and sub-component 3.2, geographic information system (GIS)-based monitoring of project realizations, office equipment and supplies, travel/local transport, and renovation of office space to accommodate a larger PIU at DoR&D, and other incremental operational costs.

E. Role of Partners

28. Several development partners are supporting the development of FSM energy sector, but more needs to be done. Key partners include the World Bank (the largest financier), the ADB, the Australian Government's DFAT, the European Union (EU), and the United Nations Development Programme (UNDP). The World Bank (through the closed Energy Sector Development Project and the ongoing SEDAP) and the ADB (through the ongoing Renewable Energy Development Project and the Project Readiness Facility) have contributed to provide reliable diesel generation in the four States and are now focusing on increasing renewable energy integration, with ADB focusing on Kosrae, Yap States, and more recently on Pohnpei and Chuuk outer islands electrification[15],and the World Bank focusing on the main islands of Pohnpei and Chuuk States. The World Bank is leading efforts to reduce the electricity access gap in Chuuk, with ongoing construction of mini grids in two islands Udot/Eot and Satowan (under SEDAP), whereas the EU supported data collection in 10 islands, and DFAT recently provided funding for the electrification of four islands in Chuuk (Fefen and Etten), Pohnpei (Pingelap), and Yap (Wolelai). Table 4 below presents partner-funded projects. Despite the significant support, major gaps remain on Chuuk electricity access, distribution grid upgrade for reliable and resilient power supply, and renewable energy integration.

Table 4. Involvement of partners in FSM energy sector

Name of Partner	Project Name	Description
World Bank	Energy Sector Development Project (ESDP, P148560) * *closed*	Installed 2 MW of diesel generators for PUC, 1.6 MW for YSPSC, and 0.6 MW for KUA Installed 200 kW of grid-tied solar PV systems. Developed national and State Energy Master Plans
World Bank	Sustainable Energy Development and Access Project (SEDAP, P165183) *ongoing	Installing 7.5 MW of diesel generation for PUC and installed 0.8 MW for YSPSC Installing 1.02 MW of solar PV systems in Chuuk and 1 MWh of BESS in Kosrae Constructing solar-powered mini grids to electrify 2 Chuuk's islands (Udot/Eot and Satowan)
ADB	Renewable Energy Development Project (REDP – 2018-2025)	Installed 2.5 MW of diesel generation and 0.8 MW of wind turbines in Yap. Installing 1.35 MW distributed ground/roof-mounted solar PV in Kosrae Installing 2.25 MW ground/roof-mounted solar PV and 4.43 MWh/4MW BESS in Yap.

[13] As agreed during negotiations and reflected in the negotiated Financing Agreement, the "CIU" means the Recipient's central implementation unit established within the Department of Finance and Administration and referred to in Section I.A.3 of Schedule 2 to this Agreement, *or any successor thereto*. Therefore, the successor arrangement of the CIU was included in the definition of the CIU.

[14] CIU staff are expected to support implementation and provide capacity building, including hands-on support for locally recruited PIU staff. The CIU will be funded under the CIU IMPACT Project.

[15] Under the CREWS project approved in late November 2024. In Chuuk, ADB is supporting EU and DFAT on the productive energy use and medium voltage lines in Pis Panau, Fefen and Etten.

		Constructing hybrid (60 kW solar and 30 kW diesel) mini grid and SHS to electrify Walung village in Kosrae.
ADB	Project Readiness Facility	Conducting feasibility studies, concept designs, and bidding document preparation for clean energy and drinking water supply in outer islands Piloting grid-connected hydroelectric solutions that are climate resilient with low safeguard impact
ADB	Climate-Resilient Energy and Water Sector (CREWS) Project	Installation of climate-resilient renewable energy and water systems with productive uses in outer islands in FSM
DFAT	Outer Island electrification Project	To electrify 2 islands (Etten and Fefen) in Chuuk, one island (Pingelaop) in Pohnpei, and one island (Wolelai) in Yap.
EU	Sustainable Energy and Accompanying Measures Project (SEAM)	Collected socio-economic data in 10 islands of Chuuk for energy demand assessment and established an energy database, Assistance to promote private sector involvement

29. The ARISE Project will focus on key remaining sector gaps to help the GoFSM advance towards the achievement of its energy sector goals. The Project will help reduce the significant electricity access gap in Chuuk by funding a higher scale electrification of unserved islands that are prioritized by both the State and National Governments. In the Project-targeted islands, where the Bank financing will construct mini grids, partnership was fostered with the ADB to fund productive uses of electricity to enhance the financial viability of the grids. In addition, ARISE will improve the reliability of electricity service and resilience of power infrastructure by rehabilitating state main island distribution networks, in which no funding was availed from development partners over the last two decades. The Project will further advance the integration of renewable energy, targeting main islands where land or suitable public building rooftops are available in coordination with other development agencies. Also, the Project will help address capacity constraints, which is an area that has received less attention and funding from development partners.

F. Lessons Learned

30. The Project preparation incorporates lessons learned from SEDAP implementation. SEDAP implementation progressed very slowly the first three years (with key works contracts signed the fourth year), mainly because of inadequate procurement management, weak PIU technical capacity, and travel restrictions during the COVID-19 pandemic. To avoid potential implementation delays under ARISE, a project preparation advance was provided; two consulting firms were selected and are conducting detailed studies to prepare bidding documents for the selection of contractors that will construct mini grids in Chuuk islands and rehabilitate distribution grids in Pohnpei and Kosrae. The consulting firms' work timelines show that two key works contracts could be signed by August 2025, within 6 months of Project effectiveness, which will significantly jumpstart implementation. In addition, the PIU's staffing will be strengthened with ongoing hiring of three staff: an internationally selected electrical engineer, a procurement officer, and an E&S development officer. Also, ARISE will help the four utilities enhance their operational capacity by funding an apprenticeship program (on the job training combine with academic enhancement) to provide certified technicians, who will support ARISE-related work and ensure appropriate maintenance after Project closure.

31. The Project also addresses a key lesson on the need for adequate installation and maintenance capacity to sustain renewable energy generation investments. Experience from renewable energy generation projects across the PICs has highlighted the need to ensure that adequate standards are applied during installation of solar PV systems and there is appropriate maintenance capacity to sustain the investments. This lesson was reflected in the Project design. Installation of solar PV systems will follow technical guidelines, including recognized standards, which were developed for PICs under the World Bank-financed regional Project (Sustainable Energy Industry Development Project). In addition, the Project supports the improvement or establishment of operational and maintenance funds (from fuel cost savings) and will provide state public utilities with certified solar PV technicians with updated information technology skills (through on-

the-job experience and academic training), which will enhance utility maintenance capacity and contribute to sustain renewable energy generation investments.

III. PROJECT IMPLEMENTATION

A. Institutional and Implementation Arrangements

32. DoR&D will implement the Project with support from DoFA and state power utilities. DoR&D has been implementing several donor-funded projects, including the SEDAP Project through a dedicated PIU, with DoFA's CIU support on FM, safeguards, and procurement. Under SEDAP, DoR&D's PIU performance has been moderately satisfactory overall. Considering lessons learned from SEDAP implementation and reflecting assessment findings, SEDAP implementation arrangements will be enhanced for ARISE implementation. DOR&D's PIU capacity will be strengthened with a recently recruited international project manager (full time based in Pohnpei) with extensive experience in managing World Bank-funded energy projects and hiring of three additional staff: electrical engineer, procurement officer, E&S development officer. The SEDAP Project assistant/implementation officer will transition as ARISE project assistant. DoR&D's PIU will be responsible for overall project implementation (including planning, budgeting, execution, monitoring, and evaluation) with fiduciary responsibility on procurement and E&S aspects. DoFA will retain the fiduciary responsibility for FM as project accounting, disbursement, and fund withdrawal in FSM are intrinsically linked with the FSM Government accounting, payments, and other financial processes that are handled only by DoFA. The DoR&D's PIU will therefore work closely with and provide inputs to DoFA's CIU[16] or successor arrangement on withdrawals, payments, accounting, budgeting, preparation of interim financial reports, and auditing, as it is currently practiced under SEDAP. The CIU will provide advisory and capacity building support to World Bank-financed PIUs—including the ARISE PIU—to enhance the capacity of locally-recruited staff and address implementation bottlenecks. In addition to the CIU support, the state power utilities (PUC, CPUC, YSPSC, and KUA) have designated key staff (including a focal point) who will assist the PIU throughout Project implementation. To ensure adequate implementation within states' territories, the State Governments and utilities will sign Project implementation agreements with DoR&D and DoFA. To facilitate higher level coordination and guidance, the PIU will report to a Project Steering Committee (already operational under SEDAP and meets every three months), chaired by the DoR&D Secretary or her/his designee and comprising representatives from state governments, state energy working groups, state power utilities, the PIU, and the CIU. The responsibilities of all institutions and day-to-day Project execution procedures are described in the Project Implementation Manual (PIM), which was cleared by the Bank and adopted by DoR&D.

B. Results Monitoring, Evaluation, and Verification Arrangements

33. DoR&D's PIU will be responsible for monitoring and evaluating progress and results with support from consultant firms, state power utilities, and the CIU. Data were collected during the Project preparation and provided baseline values for the indicators in the results framework. During implementation, the PIU will lead project monitoring and document progress with assistance from (i) consulting firms that will oversee final designs and supervise works and installation under Components 1 and 2; (ii) technical staff from the state power utilities, and (iii) CIU's advisors (on monitoring & evaluation, environmental, social, procurement, and FM). To facilitate monitoring in outer islands, the Project will fund the acquisition of a GIS-based monitoring platform such as Kobo Tool, and train representatives from the state power utilities, supervisory consulting firms (owner's engineer), and contractors to map out and document realizations. Based on assessed progress, the PIU will update the project results framework and send the World Bank progress reports, including a semestrial Project

[16] As indicated in footnote 13, the successor arrangement of the CIU was included in the CIU definition provided in the annex of the negotiated Financing Agreement.

report covering all project aspects. After the third year of implementation, a mid-term review of the Project will be conducted to assess overall project performance in achieving the development objective and recommend needed changes to be incorporated moving forward. To better capture project outcomes and facilitate citizen engagement, the Project will fund two beneficiary surveys.

C. Disbursement Arrangements

34. IDA financing will flow to a designated account (DA) managed by DoFA in collaboration with DoR&D. As the recipient of World Bank financing, DoFA, through its CIU, has been managing DAs for all World Bank-financed projects, including the SEDAP Project. Considering that (i) DoFA gained significant financing management experience, (ii) DoFA is the only FSM Government's department that has access and handles the FSM Government accounting and budgeting systems, and (iii) some aspects of ARISE Project disbursement and financial reporting are linked to the government accounting and budgeting processes (managed by DoFA), DoFA will manage the ARISE DA in close collaboration with DoR&D and make available the proceeds for project implementation. The DA will be a US Dollar account opened at a commercial bank acceptable to the World Bank. The IDA financing will be disbursed through three methods: (i) advance (into the DA), (ii) reimbursement, and (iii) direct payment. The CIU will submit withdrawal applications to either replenish the DA or to make direct payments. The financing will flow from either the DA or the World Bank to contractors (for construction of mini grids, rehabilitation of main grids, installation of solar PV systems, etc.), goods suppliers, consultant firms (for supervision and studies), operational service providers (travels, training, workshops), and PIU consultant staff (salaries). Most of the financing will fund major contracts for works/installation/goods supplies. Thus, over half of the financing will be disbursed through direct payments from the World Bank, after the PIU's validation of invoices and the CIU's submission of requests for payments.

IV. PROJECT APPRAISAL SUMMARY

A. Technical, Economic and Financial Analysis (if applicable)

Technical and Stakeholder Analysis

35. The Project's technical aspects and costing were assessed and are adequate. The renewable energy technology selected in the Project is solar PV systems because of state power utilities' higher exposure with this technology and lack of robust data on other renewable sources such as wind. The selection of solar PV systems is consistent with the FSM's Energy Master Plan, which highlights solar PV as the first choice. The integration of solar PV systems took into consideration grid stability needs (through the addition of battery storage, control systems, SCADA, grid enhancements, and protection upgrades) and nearby distribution feeder capacity (appropriate selection of locations). Procured Solar PV systems and grid upgrade/construction equipment will comply with the relevant International Electrotechnical Commission and Underwriters Laboratory standards, and their installation will be done according to the USA National Electrical Code and good climate resilience practices drawn from internationally recognized publications.[17] Costs of the solar PV systems, grid rehabilitations, and island electrification activities were estimated based on unit costs from awarded contracts under SEDAP, factoring in inflation and taxes. The technical assistance activities were selected based on the sector development needs and considering the GoFSM's energy policies and goals as well as the current capacity constraints at both national and state utility levels.

[17] Such as the National Renewable Energy Laboratory's "Solar Photovoltaics in Severe Weather: Cost Considerations for Storm Hardening PV Systems for Resilience" and the Rocky Mountain Institute's "Solar Under Storm for Policymakers - Best Practices for Resilient Photovoltaic Systems for Small Island Developing States."

36. The Project implementation readiness was enhanced through advanced procurement, hiring of critical PIU staff, and approval of the PIM. Using a project preparation advance (US$1 million[18]), two consulting firms were contracted, have finalized concept designs, and are preparing bidding documents that will be issued to request bids from international contractors. The consulting firms will assist the PIU in evaluating bids and negotiating contracts. By August 2025, it is expected that two key contracts will be ready for validation and signature to jumpstart the final designs, supply, construction of mini grids in Chuuk, and rehabilitation of distribution networks in Pohnpei, Yap, and Kosrae. The advanced procurement will ensure good disbursement within the first year of implementation. In addition, the ARISE project manager was hired, is on board, and brings significant World Bank-funded energy project management experience. The international electrical engineer and the local project assistant were selected, and their contracts were signed by DoR&D and routed for validation. The selection of the local procurement officer and the local environmental, and social development officer is ongoing. The CIU is fully staffed, has been supporting project preparation, and ready to support implementation. Furthermore, the Bank cleared, and the implementation agencies adopted, the PIM. Considering the advanced preparation, no effectiveness condition was included in the Financing Agreement.

37. *Paris Alignment*: The Project supports FSM's climate mitigation and adaptation goals and is aligned with the country's energy development plans. In its 2022 Updated NDC, FSM committed to (i) increase electricity generation from renewable energy to more than 70 percent of total generation, (ii) reduce CO_2 emissions from electricity generation by more than 65 percent below 2000 levels, and (iii) increase access to electricity to 100 percent nationwide, all three goals by 2030. These climate mitigation goals are aligned with the energy sector development goals, which include the objective of reaching universal electricity access by 2030 and increasing renewable energy generation. The Project will contribute to achieving these climate and energy goals through (i) investments to install more solar PV generation systems, construct mini grids in unelectrified outer islands, and rehabilitate distribution grids in main islands, as well as (ii) technical assistance to enhance capacity and sustain investments. On adaptation, though FSM is currently developing its National Adaptation Plan (NAP), the states have Joint State Action Plans for Disaster Risk Management and Climate Change, which highlight key adaptation principles and actions. One of the high priority adaptation actions is to improve critical infrastructure to withstand disasters and climate change. This action is supported by the Project, which will rehabilitate state power grids to enhance resilience and improve utility capacity to restore power after climate/natural hazards.

38. The Project is aligned with the goals of the Paris Agreement on both mitigation and adaptation.

a. ***Assessment and reduction of mitigation risks****:* Activities related to the installation/construction of solar PV systems, testing/commissioning of generation/distribution SCADA and BESS, solar-powered mini-grids in unelectrified islands, technical assistance, and capacity building to support renewable energy integration are universally aligned. These activities contribute to accelerating decarbonization of the power sector and are not at a material risk of having a negative impact on the country's low-GHG emissions development pathway. The commissioning/testing and troubleshooting of the generation SCADA and the connected existing and upcoming diesel generators will enable prioritization of renewable energy dispatch over diesel-based energy, which will make diesel generators a secondary source of generation that will be used only when the renewable energy generated cannot fully meet the power demand. The integration of the medium-speed diesel generation (which are the most energy efficient diesel generation at the time of purchase) is part of the least-cost decarbonization pathway modeled for the grid as part of the development of FSM Energy Master Plan. The integration does not prevent the transition to lower carbon alternatives in the future as utilization rate of diesel generation will gradually be reduced as more renewable energy comes online. Therefore, the commissioning of SCADA and connected diesel generators is aligned. In addition, to ensure reliable electricity supply from solar-powered mini

[18] A project preparation advance of US$1 million was provided under the Programmatic Project Preparation Advance whose Letter of Agreement was signed on behalf of the Association on September 13, 2021, and on behalf of the Recipient on September 20, 2021.

grids during cloudy hours or peak demand hours, minimal back-up diesel generation (which is less costly than adding more battery energy storage to meet the demand) is added, which is low risk and aligned as it would lead to very negligible emissions. The provision of bucket and auger trucks to ensure rapid restoration following an extreme weather events as well as procurement of a boat to support mini grids construction in Chuuk's outer islands (including solar-powered mini grids in Udot and Satowan) are low risk because these diesel-operated engines would be the lowest GHG emissions alternative that is technically feasible and economically viable in the FSM, have relatively short lifespan, and do not provide barriers to future fleet improvements. Overall, the Project will reduce about 5,300 tons of CO_2 equivalent (tCO_2e) emissions annually and approximately 0.11 $MtCO_2e$ over its lifecycle (20 years). The operation is considered aligned on mitigation.

b. ***Assessment and reduction of adaptation risks:*** A climate and disaster risk screening conducted for the Project revealed that the level of inherent risk to the operation is moderate and will be reduced to low following the implementation of resilience measures. Some targeted islands are in tropical cyclone-prone areas and the infrastructure to be installed could be exposed to high winds, storm surge, and floodings. To reduce the risk, the rehabilitation of the distribution network will adhere to climate resilient design and construction standards capable of withstanding climate-related hazards, including (i) replacing dilapidated wooden power pole with concrete poles, replacing air switches by automated remote-controls switches, and installing automatic fault-detecting reclosers in Pohnpei main island; (ii) constructing underground distribution feeders to critical facilities in Yap main island, (iii) replacing dilapidated wooden poles and cross arms and insulators, as well as strengthening of protection systems in Kosrae main island, and (iv) provision of bucket trucks and auger truck for more efficient vegetation management and faster restoration/recovery after hazard events in FSM. The installation of ground-mounted and rooftop Solar PV and solar-powered mini grids will also comply with hurricane/storm resilient standards and practices informed by international-recognized publications. These measures reduce the residual risk to the Project to low, and risks from climate hazards are considered as acceptable.

39. *Climate Co-benefits*: The proposed Project will contribute to Climate Co-Benefits on mitigation and adaptation by (a) supporting the generation and transport of additional renewable electricity, (b) integrating climate resilience measures into construction and rehabilitation of main island grids, (c) providing technical assistance and studies to improve the enabling climate change-related framework, and (d) providing capacity building for renewable energy scale-up. Climate mitigation co-benefits will result from activities under (i) Sub-component 1.1 through the installation of new solar-powered mini grids in unelectrified outer islands in Chuuk (replacing the use of individual diesel generators, kerosene, and biomass); (ii) Sub-component 2.1 and 2.2 through the installation of ground-mounted and rooftop solar PV systems (including installation and commissioning of SCADA and BESS) in main islands of Pohnpei and Chuuk, as well as through rehabilitation of selected feeders required to enable the transport of additional renewable electricity. In addition, the Project will contribute to the climate adaptation co-benefits in the following way: i) Sub-component 1.3 through the installation of underground distribution feeders to critical facilities, as well as elevating above ground pad-mounted transformers and switchgears, and upgrading switching and reclosing equipment in the Yap main island; ii) Sub-component 1.2 and 1.4. through rehabilitation of the existing distribution networks in the Pohnpei and Kosrae main islands; and iii) Sub-component 1.1 and Component 2 through the application of hurricane and storm resilient standards/practices in the design and installation of solar PV systems and mini grids. In addition, emergency/maintenance vehicles (bucket trucks and auger trucks) will be procured to facilitate vegetation management and to accelerate recovery after natural or climate hazards. More details can be found in the Components description section.

40. *Maximizing Finance for Development (MFD)*: The Project contributes to maximizing finance for development by fostering a more conducive framework for private sector financing. Private investment in FSM electricity sector has been limited, with the role of the private sector being mainly contractors and/or suppliers under government and/or donor-funded projects. Under Sub-component 3.1, technical assistance will be provided to build up the regulatory capacity of

DoR&D staff and enhance the regulatory framework, including development of key instruments for private sector involvement in the power sector such as power purchase agreements, licenses, and concessions. Furthermore, the Sub-component 3.1 assistance to help State Governments adopt, and power utilities apply, electricity tariffs that enable recovery of costs for efficient operation is expected to improve the financial health of state power utilities, enhancing their ability to enter into power purchase agreement with private power producers. Considering the MFD-enabling assistance, the Project has been tagged MFD-e.

41. *Gender*: The Project aims to create new and better jobs for women, particularly in technical and engineering positions, and to support their career advancement and leadership in the FSM energy sector. The PWIP program baseline report on women's employment in the Pacific Power sector (Buchhave, Angelou, Schomer. 2024) finds significant gender gap and variations across the four FSM utilities (CPUC, PUC, YSPSC, and KUA). Women's employment ranges from 3.2 percent at PUC to 31.3 percent at KUA, but across all four utilities, men are dominating technical and engineering roles (96.1 percent at CPUC, 97.6 percent at PUC, 100 percent at YSPSC, and 88.9 percent at KUA). Very few initiatives and policies are in place to promote women's employment in the sector, but leadership has shown commitment to closing these gaps, including engagement in the PWIP baseline survey. To increase women's participation in the FSM energy sector, especially in technical and engineering roles, project preparation has leveraged good practices and lessons from global and regional initiatives with support from PWIP. Under Sub-components 3.2 and 3.3, interventions across CPUC, PUC, YSPSC, and KUA will include: (i) training programs addressing gender social norms, bias, and allyship among leaders and employees; (ii) school-to-work transition programs, attachments, and internships targeting women in collaboration with educational institutions like the College of Micronesia; (iii) designing and adopting policies for women's career progression, focusing on workplace environment and respectful conduct; and (iv) a pilot to promote women's employment by private contractors. Implementation will be complemented by technical assistance from PWIP, and progress on women hiring for technical/engineering positions will be tracked in the results framework, which includes an indicator on the "increased share of women in technical and/or engineering positions."

42. *Citizen Engagement*: The Project will enable citizen engagement with local institutions, communities, and electricity customers, throughout the project life cycle. During project preparation, PUC, CPUC, KUA, and YSPSC held consultations on the scope of the Project activities with their respective state-level Energy Working Groups, which include state government officials and community representatives. PUC and CPUC consulted with public schools and community members to secure commitment to install solar PV panels on identified lands and facility rooftops. CPUC, with support from a consulting firm, conducted surveys with over seven island communities to explain the Project scope, collect socioeconomic data, estimate willingness to pay for electricity, pre-select island communities, and conduct feasibility studies. Further citizen engagement activities will be undertaken over project implementation. Citizens will be involved in several activities including (a) consultation sessions on project scope and construction/ installation timelines, (ii) information sessions on electricity connection requirements, in-house wiring, and prepaid meters, (iii) sensitization campaigns on efficient use of electricity and electricity safety, (iv) sensitization on the Grievance Redress Mechanism (GRM), and (v) beneficiary surveys on new electricity connections in selected Chuuk's islands and electricity service improvement in main islands of Pohnpei, Kosrae, and Yap. Feedback and data collected from the consultation/sensitization/survey activity participants (including GRM data and beneficiary surveys) will be documented, analyzed every six months, and summarized in the project semestrial reports. Key lessons learned will be drawn and used to improve next rounds of citizen engagement activities and project implementation in general. A Citizen Engagement indicator has been incorporated in the results framework: "Share of project beneficiaries who expressed satisfaction on new electricity connections, improved reliability of electricity service, and GRM activities." The value of the indicator will be documented over the project implementation and is expected to achieve its target considering expected improvements in outreach activities, electricity access, and electricity service reliability.

Economic justification

43. An economic analysis was carried out and shows that the Project is economically viable. The analysis methodology follows the World Bank's 'Guideline for Power Sector Investment Projects Economic Analysis' and derives the economic net present value (ENPV) and economic rate of return (EIRR) by comparing benefits and costs from cases with and without the Project. The analysis covers the Project Components 1 and 2 and includes benefits and costs from climate resilience investments. The main Project benefits are: (i) reduction in generation costs through diesel fuel savings from added renewable energy generation; (ii) avoided unserved energy from reduced duration of grid power outages and technical losses due to grid rehabilitation; (iii) improved electricity access in selected outer islands; and (iv) avoided repair and reconstruction from climate-induced and natural hazards (e.g.: coastal flooding and typhoons). The main Project costs are: (i) capital costs of grid-connected solar PV, outer island mini-grids, and main island grid rehabilitation and (ii) incremental costs to operate and maintain the rehabilitated or constructed assets. The analysis shows that the Project will yield an ENPV of US$12.52 million with an EIRR of 12.70 percent under the base case scenario. Accounting for the environmental benefits, the EIRR rises to 14.46 percent and ENPV to US$16.44 million considering a low shadow price of carbon. Though the Project economics are sensitive to the cost of diesel fuel, electricity tariffs, and frequency and intensity of extreme weather events, the results of the sensitivity analysis suggest that the Project remains economically viable even in case of significant variation of these key inputs.

Financial Sustainability

44. The Project will address financial drivers that enhance the financial viability of the state power utilities. An analysis of the audited and interim financial statements (2020–2023) of the four utilities showed that the utilities covered their cash-based operating cost, with Earnings Before Interest, Taxes, Depreciation, and Amortization (EBITDA) margins ranged between 4 to 26 percent. However, their net profit/loss margins varied more widely between -32 to 8 percent. The short-term financial liquidity positions for CPUC, KUA and YSPSC were satisfactory, with current ratios ranging between 1.7 to 10 times. However, PUC required government support in repaying its maturing loans, with current ratio of 0.6, 0.7 and 0.8 in 2019–2021. In the coming years, the key controllable financial drivers that will contribute to utilities' sustainable financial performance will include: (i) lowering power generation and distribution losses, (ii) reducing power outages; (iii) lessening the use of diesel for power generation; (iv) cost recovery and profitability of electricity, water/sewer tariffs; and (v) availability of grant and loan financing for new investments. As the Project will save diesel use costs, reduce power outages, and decrease electricity losses, it will enhance the financial cushion of the utilities while new investments in renewable energy generation, grid improvement, mini grid, and water/sewer assets are made. The financial analysis of the Project shows that it is financially viable with a financial net present value (FNPV) of US$1.7 million and a financial internal rate of return (FIRR) of 6 percent for grid investments. As for mini grid investment, it is estimated that a tariff of around US$0.50 per kWh (like the average grid tariff in Chuuk) will be required to reach a break-even financial return. In addition to the Project's infrastructure investments, technical assistance to adopt cost-reflective tariffs will provide a way forward to improve tariffs. Furthermore, the Project will enhance the utilities' operational capacity through a combination of international technical expertise, maintenance fund establishment, and gender-sensitive apprenticeship program.

B. Fiduciary

45. *Financial Management*: The FM risk is assessed as moderate.[19] Under World Bank IPF guidelines with respect to projects financed by the World Bank, the borrower and the project implementing agencies are required to maintain acceptable FM arrangements—including planning and budgeting, accounting, internal controls, funds flow, financial reporting, and auditing arrangements—acceptable to the World Bank, to provide reasonable assurance that the proceeds are used for the intended purposes for which they were granted. The implementing agency has the overall project fiduciary responsibility, with the CIU having the FM fiduciary responsibility. The CIU recently hired a FM officer, who together with the international Financial Management Advisor/Specialist and the Senior Financial Management Officer, will work closely with the PIU to establish a financial management system. An assessment of DoR&D's prior experience in implementing the ongoing SEDAP Bank-financed project (with FM support from the CIU) observed moderately satisfactory FM performance based on delay in financial reporting, preparation of annual work plan and budgets, payment processing, and audit reports. This was mainly caused by limited experience and CIU staff turnover. The Project builds on the SEDAP activities in the four States and DoFA has gained experience in Bank-funded projects implementation. To mitigate delays in submitting annual audit reports, the CIU, with support from the PIU, will prepare and submit project-level audits, which are separate from the national audit. The FSM National Government's FM regulations and policies will govern the Project FM arrangements and the Project's accounting, and financial reporting will be established in the government's Financial Management Information System. The PIU adopted the PIM, which includes the arrangements and procedures for (a) the institutional arrangements for day-to-day execution of the Project including FM arrangements; (b) project monitoring, reporting, and evaluation arrangements; and (c) any other arrangements necessary to ensure proper fiduciary coordination and implementation of the Project. The World Bank FM team will provide fiduciary guidance, support, and training to the PIU, and will monitor the FM aspects of the Project through implementation support missions.

46. *Procurement*: The procurement risk before mitigation is assessed as high and the risk assessment was completed in February 2025. Project procurement will follow the World Bank Procurement Regulations for IPF Borrowers (September 2023). The PIU has some experience in the selection of individuals and consulting firms, but lacks extensive experience in preparing technical documents, evaluating bids, and negotiating contracts for civil works. Under SEDAP, procurement faced reduced competition and low market interest (given the geographical remoteness, logistic hurdles, and relatively small scale of works); and the PIU has experienced contract implementation challenges and delayed deliverables/outputs. DoFA's CIU procurement advisor has been providing support. Hands-on expanded implementation support (HEIS) has been provided in the FSM and is expected to continue to bolster implementation. Under ARISE, the procurement will involve (i) individual consultants, (ii) consulting firms (for concept designs and supervision of works), (iii) engineering, procurement, and construction (EPC) contractors/companies (for construction/rehabilitation/installation works), and (iv) large goods purchase, shipping, and delivery to remote locations. The main procurement risks relate to delays in preparing terms of reference (to initiate procurement) and timely processing of procurement steps, as well as weak capacity in managing works contracts. To mitigate the risks and strengthen the procurement capacity, the following measures have been established and agreed to be implemented: (i) a procurement officer will be added to the PIU; (ii) an electrical engineer will be hired to draft terms of reference, assist in procurement, and help manage contracts; and (iii) internationally recruited supervision engineering firms will help prepare bidding documents and provide procurement assistance (technical evaluation of bids, support on contract negotiation, and contract management). In addition, the Bank team will support the PIU in reviewing bidding documents for major works and addressing procurement bottlenecks.

[19] The assessment was completed on November 11, 2024, in accordance with the World Bank Guidance 'Financial Management Manual for World Bank Investment Project Financing Operations' issued on September 7, 2021.

C. Environmental, Social and Legal Operational Policies

Legal Operational Policies	Triggered?
Projects on International Waterways OP 7.50	No
Projects in Disputed Area OP 7.60	No

47. The E&S risks for the Project are assessed as moderate, given that risks and impacts are expected to be temporary, predictable, and readily managed through standard design and mitigation measures. The Project will seek to use borrower frameworks to manage E&S risks to the extent that these comply with the Environmental and Social Standards (ESS). Potential E&S risks arise primarily in relation to civil works associated with the construction of mini grids and solar home systems, rehabilitation and upgrade of distribution networks, and installation of grid-connected solar PVs. Associated E&S risks include occupational health and safety (OHS) risk to workers, community health and safety risks, particularly where civil works take place in areas of public or community spaces, sourcing of aggregates for activities related to enhancing the resilience of existing distribution networks, waste management, ground and waterway pollution, minor land impacts associated with access to and/or use of land for installation of mini grids and solar PV systems, real or perceived inequality across households in accessing projects benefits, and risks related to Sexual Exploitation and Abuse and Sexual Harassment amongst workers and the community. Sites for mini grid and solar PV installation will be confirmed after completion of the feasibility studies, expected after project approval. Government land will be prioritized and no involuntary resettlement or land acquisition is expected. As the design and exact locations of project activities will be determined during implementation, an Environmental and Social Management Framework (ESMF) has been prepared which outlines the principles, rules, guidelines, procedures, and tools to assess and manage E&S risks and potential impacts. The ESMF includes Labor Management Procedures, a Chance Finds Procedure, and Land Access Procedures to provide guidance on managing land access. Requirements and actions emanating from the ESMF are captured in the Environmental and Social Commitment Plan (ESCP). A Stakeholder Engagement Plan (SEP) including a grievance redress mechanism has also been prepared. As project activities are planned across all four states of FSM, the Project will need to include effective measures to ensure sufficient supervision and monitoring at all sites throughout implementation. The ESCP and SEP were disclosed in country on December 10, 2024, and were disclosed by the Bank on February 3, 2025.

48. There are allegations of forced labor risks associated with the polysilicon (a key input for solar panels production) suppliers. The PIU will require bidders to provide two declarations: a Forced Labor Performance Declaration (which covers past performance), and a Forced Labor Declaration (which covers future commitments to prevent, monitor and report on any forced labor, cascading the requirements to their own sub-contractors and suppliers). In addition, the PIU will include enhanced language on forced labor in the procurement contracts. Under Environmental and Social Standard 2 (ESS2), where there is a significant risk of forced labor related to primary supply workers, the PIU will require the primary supplier to identify those risks and if forced labor cases are identified, the PIU will require the primary supplier to take appropriate steps to remedy them. Ultimately, where remedy is not possible, the PIU will, within a reasonable period, shift the Project's primary suppliers to suppliers that can demonstrate that they are meeting the relevant requirements of ESS2. Prior to beginning the procurement process, the PIU will undertake a market analysis to identify the possible sellers of solar panels to the Project. The bidding documents will emphasize forced labor risks in solar panels and components and will require

that sellers of solar panels to the Project will not engage or employ any forced labor among their work force. The World Bank will prior review procurement packages of solar panels and components to ensure compliance.

D. Grievance Redress Services

49. Grievance Redress. Communities and individuals who believe that they are adversely affected by a project supported by the World Bank may submit complaints to existing project-level grievance mechanisms or the Bank's Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed in order to address project-related concerns. Project affected communities and individuals may submit their complaint to the Bank's independent Accountability Mechanism (AM). The AM houses the Inspection Panel, which determines whether harm occurred, or could occur, as a result of Bank non-compliance with its policies and procedures, and the Dispute Resolution Service, which provides communities and borrowers with the opportunity to address complaints through dispute resolution. Complaints may be submitted to the AM at any time after concerns have been brought directly to the attention of Bank Management and after Management has been given an opportunity to respond. For information on how to submit complaints to the Bank's Grievance Redress Service (GRS), visit http://www.worldbank.org/GRS. For information on how to submit complaints to the Bank's Accountability Mechanism, visit https://accountability.worldbank.org.

V. KEY RISKS

50. The overall Project risk is assessed as 'Substantial' mainly because of weak institutional capacity for implementation and sustainability and procurement risks.

51. Institutional capacity for implementation and sustainability (Substantial): State power utilities have limited technical staff capacity, which could lead to suboptimal level of involvement in project implementation. Also, the utilities' ability to adequately maintain and sustain investments is limited as they operate with insufficient budget for maintenance and asset replacement, partly due to non-cost recovery tariffs. To address the risks, the Project will hire an international electrical engineer and consulting firms to assist the PIU and the power utilities in supervising works and installation. In addition, the Project includes activities to strengthen the utilities' technical capacity through a combination of international technical expertise, maintenance fund establishment, and gender-sensitive apprenticeship program. The Project will also help implement an action plan to move towards cost recovery tariffs while protecting the poor. The action plan is being developed as part of a Bank-funded tariffs study.

52. Fiduciary (Procurement) (Substantial): The fiduciary risk is assessed as substantial mainly because of the procurement risk, as financial management risk is moderate. FSM energy projects tend to attract few international bidders because of relatively low scale of works and geographic remoteness. Both PIU and CIU have limited contract management capacity. To mitigate the risks, several international contractors and consulting firms have been identified in the project procurement strategy for development and will be directly invited to a pre-bidding conference to present the procurement plan. In addition, several procurement items were bundled and three major works/installation biddings (over US$10 million each), which are likely to attract more international competition, will be issued. Furthermore, aggregation of procurement packages from this Project and the RMI REGAIN project (e.g. on mini grids construction and critical vehicle supply) will be piloted. Also, the Project will hire supervisory consulting firms with experienced contract management specialists to help DoR&D manage key high value contracts.

ANNEX 1. RESULTS FRAMEWORK

PDO Indicators by PDO Outcomes

Baseline	Period 1	Period 2	Period 3	Period 4	Period 5	Closing Period
To increase access to electricity						
People provided with new or improved access to electricity (Number)						
Mar/2025	Mar/2026	Mar/2027	Mar/2028	Mar/2029	Mar/2030	Mar/2031
0	0	0	0	9,600	19,000	32,000
To improve the reliability of electricity service in targeted project areas						
Average reduction of unplanned power outages on the distribution networks in Pohnpei, Yap and Kosrae (Percentage)						
Mar/2025	Mar/2026	Mar/2027	Mar/2028	Mar/2029	Mar/2030	Mar/2031
0	0	0	0	10	20	40
To increase renewable energy generation in Pohnpei and Chuuk						
Renewable energy capacity enabled with direct support (Megawatt) [CRI]						
Mar/2025	Mar/2026	Mar/2027	Mar/2028	Mar/2029	Mar/2030	Mar/2031
0	0	0	0	1.00	2.20	2.70

Intermediate Indicators by Components

Baseline	Period 1	Period 2	Period 3	Period 4	Period 5	Closing Period
Electricity Service Expansion						
Households, businesses, institutions, and productive use units with new electricity service in Chuuk (Number)						
Mar/2025	Mar/2026	Mar/2027	Mar/2028	Mar/2029	Mar/2030	Mar/2031
0	0	0	0	370	550	600
Installed renewable energy capacity in selected islands of Chuuk to be electrified (Megawatt)						
Mar/2025	Mar/2026	Mar/2027	Mar/2028	Mar/2029	Mar/2030	Mar/2031
0	0	0	0	0.53	0.70	0.70
Households benefiting from reduction of unplanned distribution SAIDI in Pohnpei, Yap and Kosrae (Number)						
Mar/2025	Mar/2026	Mar/2027	Mar/2028	Mar/2029	Mar/2030	Mar/2031
0	0	0	0	1,600	3,400	5,350

➢Pohnpei (Number)						
Mar/2025	Mar/2026	Mar/2027	Mar/2028	Mar/2029	Mar/2030	Mar/2031
0	0	0	0	1,400	3,000	4,500
➢Yap (Number)						
Mar/2025	Mar/2026	Mar/2027	Mar/2028	Mar/2029	Mar/2030	Mar/2031
0	0	0	0	100	200	350
➢Kosrae (Number)						
Mar/2025	Mar/2026	Mar/2027	Mar/2028	Mar/2029	Mar/2030	Mar/2031
0	0	0	0	100	200	500
Unplanned Distribution Network SAIDI (System Average Interruption Duration Index) in Kosrae (Hours)						
Mar/2025	Mar/2026	Mar/2027	Mar/2028	Mar/2029	Mar/2030	Mar/2031
11.10	11.10	11.10	11.10	9.70	8.20	6.20
Unplanned Distribution Network SAIDI (System Average Interruption Duration Index) in Yap (Hours)						
Mar/2025	Mar/2026	Mar/2027	Mar/2028	Mar/2029	Mar/2030	Mar/2031
7.30	7.30	7.30	7.30	6.60	5.80	4.90
Unplanned Distribution Network SAIDI (System Average Interruption Duration Index) in Pohnpei (Hours)						
Mar/2025	Mar/2026	Mar/2027	Mar/2028	Mar/2029	Mar/2030	Mar/2031
29.30	29.30	29.30	29.30	24.60	19.90	13.70
People provided with direct access to electricity through new connections (Number of people) [CRI]						
Mar/2025	Mar/2026	Mar/2027	Mar/2028	Mar/2029	Mar/2030	Mar/2031
0	0	0	0	2,000	3,200	3,700
➢People provided with direct access to electricity through new connections - Female (Number of people) [CRI]						
Mar/2025	Mar/2026	Mar/2027	Mar/2028	Mar/2029	Mar/2030	Mar/2031
0	0	0	0	970	1,590	1,800
➢People provided with direct access to electricity through new connections - Youth (Number of people) [CRI]						
Mar/2025	Mar/2026	Mar/2027	Mar/2028	Mar/2029	Mar/2030	Mar/2031
0	0	0	0	420	730	800
Renewable Energy Generation						
Projected lifetime net greenhouse gas (GHG) emissions (CO_2 equvalent) (Metric ton)						
Mar/2025	Mar/2026	Mar/2027	Mar/2028	Mar/2029	Mar/2030	Mar/2031
0	0	0	0	5,000	100,000	107,000
Installed renewable energy capacity in Pohnpei (Megawatt)						
Mar/2025	Mar/2026	Mar/2027	Mar/2028	Mar/2029	Mar/2030	Mar/2031
0	0	0	0	0.50	1	1.50

Installed renewable energy capacity in Weno (Megawatt)						
Mar/2025	Mar/2026	Mar/2027	Mar/2028	Mar/2029	Mar/2030	Mar/2031
0	0	0	0	0	0.50	0.50
Installed battery energy storage capacity (Megawatt hour(MWh))						
Mar/2025	Mar/2026	Mar/2027	Mar/2028	Mar/2029	Mar/2030	Mar/2031
0	0	0	0	2.40	4.60	4.60
Institutional Strengthening and Implementation Support						
Power utilities that adjusted electricity tariffs (Number)						
Mar/2025	Mar/2026	Mar/2027	Mar/2028	Mar/2029	Mar/2030	Mar/2031
0	0	0	0	0	1	2
Certified utility staff from the apprenticeship program (Number)						
Mar/2025	Mar/2026	Mar/2027	Mar/2028	Mar/2029	Mar/2030	Mar/2031
0	0	0	4	8	12	16
Increased share of women in technical and/or engineering positions (Percentage)						
Mar/2025	Mar/2026	Mar/2027	Mar/2028	Mar/2029	Mar/2030	Mar/2031
0	0	0	0	3	5	7
➢Introduction of quotas for women in the apprenticeship program (Yes/No)						
Mar/2025	Mar/2026	Mar/2027	Mar/2028	Mar/2029	Mar/2030	Mar/2031
No	No	No	Yes	Yes	Yes	Yes
Share of Project Beneficiaries who expressed satisfaction on new electricity connections, improved reliability of electricity service, and GRM activities (Percentage)						
Mar/2025	Mar/2026	Mar/2027	Mar/2028	Mar/2029	Mar/2030	Mar/2031
0	0	0	40	45	50	60

Monitoring & Evaluation Plan: PDO Indicators by PDO Outcomes

To increase access to electricity	
People provided with new or improved access to electricity (Number)	
Description	This measures the total number of (i) people provided with new access to electricity through mini grids constructed in selected islands of Chuuk, and (ii) people provided with improved (more reliable) access to electricity through grid rehabilitation and upgrades in the main islands of Pohnpei, Yap and Kosrae. This indicator is aligned with one of the intermediate indicators of the Accelerating Sustainable Energy Transition MPA.
Frequency	Annually
Data source	Progress reports
Methodology for Data Collection	Number of people provided with new access to electricity is calculated by (i) multiplying the number of households provided with electricity access from new connections through mini grids constructed in each selected island of Chuuk by the household size of the island and (ii) summing up the numbers. Number of people provided with improved access to electricity is calculated by (i) multiplying the number of residential customers connected to the grids (main islands of Pohnpei, Yap and Kosrae) that are rehabilitated and upgraded and provided with improved (more reliable) electricity service by the household size of each main island, and (ii) summing up the numbers. The household size of each island is based on the 2010 Census of the government of FSM.
Responsibility for Data Collection	PIU, DoR&D, CPUC, KUA, PUC,YSPSC
To improve the reliability of electricity service in targeted project areas	
Average reduction of unplanned power outages on the distribution networks in Pohnpei, Yap and Kosrae (Percentage)	
Description	This indicator measures the weighted average reduction of unplanned distribution network SAIDI (expressed in hours per year) in the main grids of Pohnpei, Yap, and Kosrae. The reduction is weighted by number of total electric customers along the main power distribution feeder lines that will be rehabilitated and upgraded in the three main islands under the ARISE project.
Frequency	Annually
Data source	Progress reports; Reports - Consulting Services for Pohnpei, Kosrae and Yap Distribution Network Rehabilitation / Strengthening (by Tetra Tech ES, Inc.)
Methodology for Data Collection	Data including SAIDI and the number of electric customers connected to the grids is collected from the utilities including PUC, YSPSC and KUA.
Responsibility for Data Collection	PIU, DoR&D, PUC, YSPSC, and KUA
To increase renewable energy generation in Pohnpei and Chuuk	
Renewable energy capacity enabled with direct support (Megawatt) [CRI]	
Description	This measures the total power generation capacity from renewable energy facilities constructed in Pohnpei main island and Chuuk's main and outer islands, funded by the ARISE project. This indicator is aligned with one of the PrDO indicators of the Accelerating Sustainable Energy Transition MPA.
Frequency	Annually
Data source	Progress reports
Methodology for Data Collection	Total capacity of solar PV installed in Pohnpei main island and Chuuk's Weno and outer islands. Data is collected from the PIU with supports from PUC and CPUC.
Responsibility for Data Collection	PIU, DoR&D, PUC and CPUC

Monitoring & Evaluation Plan: Intermediate Results Indicators by Components

Electricity Service Expansion	
Households, businesses, institutions, and productive use units with new electricity service in Chuuk (Number)	
Description	This measures the total number of households, businesses, institutions and productive use units provided with new access to electricity through mini grids constructed in selected islands of Chuuk.
Frequency	Annually

Data source	Progress reports; Reports - technical assistance for ARISE in Chuuk State (by Trama TecnoAmbiental, S.L. (TTA))
Methodology for Data Collection	Data is collected by summing up the number of households, businesses, institutions, and productive use units that will receive new connection points through mini grids constructed in the selected islands of Chuuk.
Responsibility for Data Collection	PIU, DoR&D, CPUC
Installed renewable energy capacity in selected islands of Chuuk to be electrified (Megawatt)	
Description	This measures the total power generation capacity from renewable energy in mini grid facilities constructed in Chuuk's selected islands through the ARISE project.
Frequency	Annually
Data source	Progress reports
Methodology for Data Collection	The total capacity of solar PV installed in mini grids of Chuuk's selected islands. Data is collected from the PIU with support from CPUC.
Responsibility for Data Collection	PIU, DoR&D, and CPUC
Households benefiting from reduction of unplanned distribution SAIDI in Pohnpei, Yap and Kosrae (Number)	
Description	This measures the total number of households benefiting from reduced unplanned power outages in the distribution networks of the main islands of Pohnpei, Yap, and Kosrae.
Frequency	Annually
Data source	Progress reports
Methodology for Data Collection	The number of households refers to the number of residential customers connected to the three utilities' main grids that will be rehabilitated and upgraded under the ARISE project. The three utilities are PUC, YSPSC, and KUA.
Responsibility for Data Collection	PIU, DoR&D, PUC, YSPSC, and KUA
Pohnpei (Number)	
Description	This measures the number of households benefitting from the reduced unplanned power outages in the distribution network of Pohnpei main island.
Frequency	Annually
Data source	Progress reports
Methodology for Data Collection	The number of households refers to the number of residential customers connected to the PUC's main grids that will be rehabilitated and upgraded under the ARISE project.
Responsibility for Data Collection	PIU, DoR&D, and PUC
Yap (Number)	
Description	This measures the number of households benefitting from the reduced unplanned power outages in the distribution network of Yap main island.
Frequency	Annually
Data source	Progress reports
Methodology for Data Collection	The number of households refers to the number of residential customers connected to the YSPSC's main grid that will be rehabilitated and upgraded under the ARISE project.
Responsibility for Data Collection	PIU, DoR&D, and YSPSC
Kosrae (Number)	
Description	This measures the number of households benefitting from the reduced unplanned power outages in the distribution network of Kosrae main island.
Frequency	Annually
Data source	Progress reports
Methodology for Data Collection	The number of households refers to the number of residential customers connected to the KUA's main grid that will be rehabilitated and upgraded under the ARISE project.
Responsibility for Data Collection	PIU, DoR&D, and KUA
Unplanned Distribution Network SAIDI (System Average Interruption Duration Index) in Kosrae (Hours)	
Description	This measures the number of hours per year of unplanned power outages experienced by the average customer in the

	distribution network of Kosrae main island. SAIDI refers to System Average Interruption Duration Index.
Frequency	Annually
Data source	Progess reports; Reports - Consulting Services for Pohnpei, Kosrae and Yap Distribution Network Rehabilitation / Strengthening (by Tetra Tech ES, Inc.)
Methodology for Data Collection	Data is collected from KUA or engineering firms that provide technical assistance for KUA. The unplanned distribution SAIDI baseline was taken as 11.1 hours per year for KUA. While the 2031 target for unplanned distribution SAIDI is 6.2 hours per year for KUA.
Responsibility for Data Collection	PIU, DoR&D and KUA
Unplanned Distribution Network SAIDI (System Average Interruption Duration Index) in Yap (Hours)	
Description	This measures the number of hours per year of unplanned power outages experienced by the average customer in the distribution network of Yap's main island. SAIDI refers to System Average Interruption Duration Index.
Frequency	Annually
Data source	Progress reports; Reports - Consulting Services for Pohnpei, Kosrae and Yap Distribution Network Rehabilitation / Strengthening (by Tetra Tech ES, Inc.)
Methodology for Data Collection	Data is collected from YSPSC or engineering firms that provide technical assistance for YSPSC. The unplanned distribution SAIDI baseline was taken as 7.3 hours per year for YSPSC. The 2031 target for unplanned distribution SAIDI is 4.9 hours per year for YSPSC.
Responsibility for Data Collection	PIU, DoR&D and YSPSC
Unplanned Distribution Network SAIDI (System Average Interruption Duration Index) in Pohnpei (Hours)	
Description	This measures the number of hours per year of unplanned power outages experienced by the average customer in the distribution network of Pohnpei's main island. SAIDI refers to System Average Interruption Duration Index.
Frequency	Annually
Data source	Progress reports; Reports - Consulting Services for Pohnpei, Kosrae and Yap Distribution Network Rehabilitation / Strengthening (by Tetra Tech ES, Inc.)
Methodology for Data Collection	Data is collected from PUC or engineering firms that provide technical assistance for PUC.The unplanned distribution SAIDI baseline was taken as 29.3 hours per year for PUC. The 2031 target for unplanned distribution SAIDI is 13.7 hours per year for PUC.
Responsibility for Data Collection	PIU, DoR&D and PUC
People provided with direct access to electricity through new connections (Number of people) [CRI]	
Description	This measures the total number of people provided with electricity access from new connections through mini grids constructed in selected islands of Chuuk.
Frequency	Annually
Data source	Progress reports; Reports - technical assistance for ARISE in Chuuk State (by Trama TecnoAmbiental, S.L. (TTA))
Methodology for Data Collection	Number of people is calculated by (i) multiplying the number of households provided with electrcitiy access from new connections through mini grids constructed in each island by household size of the island and (ii) aggregating the numbers of people of each island. The household size of each island was based on the 2010 Census of the government of FSM.
Responsibility for Data Collection	PIU, DoR&D and CPUC
People provided with direct access to electricity through new connections - Female (Number of people) [CRI]	
Description	This measures the total female number of people provided with electricity access from new connections through mini grids constructed in selected islands of Chuuk.
Frequency	Annually
Data source	Progress reports
Methodology for Data Collection	Number of females is calculated by (i) multiplying the number of households provided with electrcitiy access from new connections through mini grids constructed in each island by household size and female share of the island, and (ii) aggregating the numbers of females of each island. The household size and female share of each island were based on the 2010 Census of the government of FSM.
Responsibility for Data Collection	PIU, DoR&D and CPUC

People provided with direct access to electricity through new connections - Youth (Number of people) CRI	
Description	This measures the total number of youth provided with electricity access from new connections through mini grids constructed in selected islands of Chuuk. Youth includes groups of people aged 15 to 24.
Frequency	Annually
Data source	Progress reports
Methodology for Data Collection	Number of youth is calculated by (i) multiplying the number of households provided with electricity access from new connections through mini grids constructed in each island by household size and youth share of the island, and (ii) aggregating the numbers of youth of each island. The household size and youth of each island were based on the 2010 Census of the government of FSM.
Responsibility for Data Collection	PIU, DoR&D and CPUC
Renewable Energy Generation	
Projected lifetime net greenhouse gas (GHG) emissions (CO2 equvalent) (Metric ton)	
Description	Projected lifetime greenhouse gas (GHG) emissions are calculated as the difference between project gross (absolute) emissions aggregated over the economic lifetime of a project (or renewable energy facility) and the emissions of a baseline (counterfactual) scenario aggregated over the same time horizon. The counterfactual scenario emissions are those that would be generated in the absence of the RE facility: this can be derived through the grid CO2 emission factors (national level), in turn defined as the amount of CO2 released into the atmosphere per unit of energy produced during the generation of electricity. This indicator is aligned with one of the PrDO indicators of the Accelerating Sustainable Energy Transition MPA.
Frequency	Annually
Data source	Progress reports
Methodology for Data Collection	Data required for GHG calculation is collected by the PIU, and the methodology and formulation for calculation will be provided by the Bank in the form of excel, with tehcnical assistance.
Responsibility for Data Collection	PIU and DoR&D
Installed renewable energy capacity in Pohnpei (Megawatt)	
Description	This measures the total power generation capacity from renewable energy facilities constructed in Pohnpei main island through the ARISE project.
Frequency	Annually
Data source	Progress reports
Methodology for Data Collection	Data is collected by the PIU with supports from PUC.
Responsibility for Data Collection	PIU, DoR&D, and PUC
Installed renewable energy capacity in Weno (Megawatt)	
Description	This measures the total power generation capacity from renewable energy facilities constructed in Chuuk's Weno island through the ARISE project.
Frequency	Annually
Data source	Progress reports
Methodology for Data Collection	Data is collected by the PIU with supports from CPUC.
Responsibility for Data Collection	PIU, DoR&D, and CPUC
Installed battery energy storage capacity (Megawatt hour(MWh))	
Description	This measures the total capacity of battery energy storage systems (BESS) installed in Pohnpei's main island and Chuuk's main islands and outer islands through the ARISE project.
Frequency	Annually
Data source	Progress reports
Methodology for Data Collection	Data is collected by the PIU with supports from PUC and CPUC.
Responsibility for Data	PIU, DoR&D, PUC and CPUC

Collection	
Institutional Strengthening and Implementation Support	
Power utilities that adjusted electricity tariffs (Number)	
Description	This measures the total number of power utilities that adjusted their electricity tariffs or adopted revised electricity tariffs thanks to the assistance provided through the project.
Frequency	Annually
Data source	Progress reports
Methodology for Data Collection	Data is collected by the PIU with supports from the utilities, including PUC, CPUC, YSPSC and KUA.
Responsibility for Data Collection	PIU, DoR&D, PUC, CPUC, YSPSC and KUA
Certified utility staff from the apprenticeship program (Number)	
Description	This measures the total number of staff from PUC, CPUC, KUA, and YSPSC who attended the apprenticeship program and were certified (solar technician, linemens, plant operators).
Frequency	Annually
Data source	Progress reports
Methodology for Data Collection	Data is collected by the PIU with supports from the utilities, including PUC, CPUC, YSPSC and KUA.
Responsibility for Data Collection	PIU, DoR&D, PUC, CPUC, YSPSC and KUA
Increased share of women in technical and/or engineering positions (Percentage)	
Description	This measures the increased share of women in technical and/or engineering positions within the utilities including PUC, CPUC, YSPSC and KUA.
Frequency	Annually
Data source	Progress reports
Methodology for Data Collection	Data is collected by the PIU with supports from the utilities, including PUC, CPUC, YSPSC and KUA in collaboration with PWIP team.
Responsibility for Data Collection	PIU, DoR&D, PUC, CPUC, YSPSC and KUA
Introduction of quotas for women in the apprenticeship program (Yes/No)	
Description	This measures whether the utilities, including PUC, CPUC, YSPSC and KUA, introduce quotas for women and apply it in the apprenticeship program under the ARISE project.
Frequency	Annually
Data source	Progress reports
Methodology for Data Collection	Data is collected by the PIU with supports from the utilities, including PUC, CPUC, YSPSC and KUA.
Responsibility for Data Collection	PIU, DoR&D, PUC, CPUC, YSPSC and KUA
Share of Project Beneficiaries who expressed satisfaction on new electricity connections, improved reliability of electricity service, and GRM activities (Percentage)	
Description	This indicator captures the share of (project activity) beneficiaries who expressed satisfaction from activities that they participated in or benefited from. Some targeted project activities include beneficiary surveys (for new households with electricity service and households customers who benefited from improved reliability of electricity service), GRM sensitization/implementation, outreach activities, other sensitization activities.
Frequency	Annually
Data source	Progress reports, GRM mechanism and surveys to be conducted under the project
Methodology for Data Collection	Data is collected by the PIU and CIU.
Responsibility for Data Collection	PIU, DoR&D, and CIU