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Report No. PAD5623

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT AND
INTERNATIONAL DEVELOPMENT ASSOCIATION

PROJECT APPRAISAL DOCUMENT

ON

A PROPOSED GRANT IN THE AMOUNT OF SDR 3.8 MILLION (US$5 MILLION EQUIVALENT)
TO THE ASEAN CENTRE FOR ENERGY

A PROPOSED CREDIT IN THE AMOUNT OF SDR 126.7 MILLION (US$167.6 MILLION EQUIVALENT),
A PROPOSED SHORTER MATURITY LOAN IN THE AMOUNT OF SDR 24.5 MILLION
(US$32.4 MILLION EQUIVALENT), AND
A PROPOSED GRANT FROM THE GLOBAL PARTNERSHIP FOR RESULTS-BASED APPROACHES MULTI-DONOR TRUST FUND IN THE AMOUNT OF US$4.2 MILLION
TO THE INDEPENDENT STATE OF PAPUA NEW GUINEA

A PROPOSED GRANT IN THE AMOUNT OF SDR 45.6 MILLION (US$60 MILLION EQUIVALENT)
TO THE REPUBLIC OF THE MARSHALL ISLANDS

FOR AN

ACCELERATING SUSTAINABLE ENERGY TRANSITION PROGRAM
USING THE MULTI-PHASE PROGRAMMATIC APPROACH

WITH AN OVERALL FINANCING ENVELOPE OF US$2,500 MILLION

August 13, 2024

Energy & Extractives
East Asia and Pacific

CURRENCY EQUIVALENTS

(Exchange Rate Effective April 30th, 2024, applicable to grants)

Currency Unit =	SDR
SDR 0.7588 =	US$1.00

(Exchange Rate Effective May 31st, 2024, applicable to credits)

Currency Unit =	SDR
SDR 0.7556 =	US$1.00

FISCAL YEAR
January 1 - December 31

Regional Vice President:	Manuela V. Ferro
Country Director:	Stephen N. Ndegwa
Regional Director:	Sudeshna Ghosh Banerjee
Practice Manager:	Jie Tang
Task Team Leaders:	Claudia Ines Vasquez Suarez, Xiaodong Wang

ABBREVIATIONS AND ACRONYMS	
ACE	ASEAN Centre for Energy
ADB	Asian Development Bank
AM	Accountability Mechanism
APA	Alternate Procurement Arrangements
APG	ASEAN Power Grid
ASEAN	Association of Southeast Asian Nations
BESS	Battery Energy Storage Systems
BOOT	Build Own Operate and Transfer
CAPEX	Capital Expenditure
CCDR	Country Climate and Development Report
CERC	Contingent Emergency Response Component
CESMP	Contractor Environmental and Social Management Plan
CIU	Central Implementation Unit
CO_2	Carbon Dioxide
CPF	Country Partnership Framework
CUB	Combined Utilities Board
DA	Designated Account
DER	Distributed Energy Resources
DFIL	Disbursement and Financial Information Letter
DIDA	Division of International Development Assistance
DLI	Disbursement-linked Indicator
DoT	Department of Treasury
DPF	Development Policy Financing
E&S	Environmental and Social
EAP	East Asia and the Pacific
EIRR	Economic Internal Rate of Return
ENPV	Economic Net Present Value
EPC	Engineering, Procurement, and Construction
EPM	Employer's Project Manager
ERC	Energy Regulatory Commission
ERR	Economic Rate of Return
ESCP	Environmental and Social Commitment Plan
ESF	Environmental and Social Framework
ESIA	Environmental and Social Impact Assessment
ESMAP	Energy Sector Management Assistance Program
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
ESRC	Environmental and Social Risk Classification
ESRS	Environmental and Social Review Summary
ESS	Environmental and Social Standard
EUPRIP	Energy Utility Performance and Reliability Improvement Project
e-waste	Electronic and Electrical Waste
FHH	Female-headed household
FI	Financial Intermediary
FIRR	Financial Internal Rate of Return
FM	Financial Management
FNPV	Financial Net Present Value
FRR	Financial Rate of Return
GA	Grant Administrator
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GIS	Geographic Information System
GIZ	*Deutsche Gesellschaft für Internationale Zusammenarbeit* (German Development Cooperation)
GJ	Gigajoules
GNI	Gross National Income
GoPNG	Government of Papua New Guinea
GoRMI	Government of the Republic of the Marshall Islands
GPRBA	Global Partnership for Results-Based Approaches
GRM	Grievance Redress Mechanism
GRS	Grievance Redress Service
GtCO2eq	Gigatons of Carbon Dioxide Equivalent
GW	Gigawatt
HEIS	Hands-on Expanded Implementation Support
HH	Household
HPP	Hydropower plant
IA	Implementing Agency
IBRD	International Bank for Reconstruction and Development
IDA	International Development Association
IE	Implementing Entity
IFC	International Finance Corporation
IFR	Interim Financial Report
IPF	Investment Project Financing
IPP	Independent Power Producer
IRENA	International Renewable Energy Agency
IT	Information Technology
IVA	Independent Verification Agent
KADA	Kwajalein Atoll Development Authority
KAJUR	Kwajalein Atoll Joint Utilities Resource
KCH	Kumul Consolidated Holdings
KPI	Key Performance Indicator
kV	Kilovolt
kW	Kilowatt
kWh	Kilowatt Hour
Lao PDR	Lao People's Democratic Republic
LARF	Land Access and Resettlement Framework
LCPDP	Least Cost Power Development Plan
LMP	Labor Management Plan
LTS	Long-Term Strategy
LV	Low Voltage
M&E	Monitoring and Evaluation
M&S	Monitoring and Supervision
MDBs	Multilateral Development Banks

MEC	Marshalls Energy Company
MFBPS	Ministry of Finance, Banking and Postal Services
MHH	Male-headed household
MIGA	Multilateral Investment Guarantee Agency
MJ	Megajoules
MOF	Ministry of Finance
MoU	Memorandum of Understanding
MPA	Multi-Phase Programmatic Approach
MSK	Minimum Supply Kit
MTDP	Medium-Term Development Plan
MTF	Multi-Tier Framework
MTR	Mid-Term Review
MV	Medium Voltage
MW	Megawatt
MWh	Megawatt-hour
MWp	Megawatt Peak
NAP	National Adaptation Plan
NDC	Nationally Determined Contribution
NEA	National Energy Authority
NEC	National Energy Commission
NEO	National Energy Office
NEROP	National Electrification Rollout Plan
NPV	Net Present Value
O&M	Operations and Maintenance
OE	Owner's Engineer
OHS	Occupational Health and Safety
PA	Project Account
PAD	Project Appraisal Document
PASA	Programmatic Advisory Services and Analytics
PCB	Polychlorinated Biphenyl
PCE	Private Capital Enabled
PCM	Private Capital Mobilization
PDO	Project Development Objective
PFM	Public Financial Management
PforR	Program-for-Results Financing
PIC	Pacific Island Country
PIM	Project Implementation Manual
PIU	Project Implementing Unit
PMU	Project Management Unit
PNG	Papua New Guinea
POM	Project Operations Manual
PPA	Pacific Power Association
PPL	Papua New Guinea Power Ltd.
PPP	Public-Private Partnership
PPSD	Project Procurement Strategy for Development
PRAMS	Procurement Risk Assessment and Management System
PrDO	Program Development Objective
PSC	Project Steering Committee
PSs	Performance Standards for Private Sector Activities
PT	Project Team
PV	Photovoltaic
PWIP	Pacific Women in Power
RBC/CF	Results-Based Climate and/or Carbon Finance
RBF	Results-Based Financing
RE	Renewable Energy
REC	Renewable Energy Certificate
RMI	Republic of the Marshall Islands
RPF	Regional Partnership Framework
SAIDI	System Average Interruption Duration Index
SAIFI	System Average Interruption Frequency Index
SCADA	Supervisory Control and Data Acquisition
SCALE	Scaling Climate Action by Lowering Emissions
SCD	Systematic Country Diagnostic
SDG	Sustainable Development Goal
SDR	Special Drawing Right
SEA/SH	Sexual Exploitation and Abuse and Sexual Harassment
SEDeP	Sustainable Energy Development Project
SEF	Stakeholder Engagement Framework
SEP	Stakeholder Engagement Plan
SESA	Strategic Environmental and Social Assessment
SHS	Solar Home System
SML	Shorter Maturity Loan
SoE	State-owned Enterprise
SORT	Systematic Operations Risk-rating Tool
STEM	Science, technology, engineering, and mathematics
STEP	Systematic Tracking of Exchanges in Procurement
T&D	Transmission and Distribution
TA	Technical Assistance
TCAF	Transformative Carbon Asset Facility
tCO_2e	Tons of Carbon Dioxide Equivalent (metric)
TJ	Terajoule
ToR	Terms of Reference
TTL	Task Team Leader
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
US	United States of America
US$	United States Dollar
USAID	United States Agency for International Development
VGF	Viability Gap Financing
VRE	Variable Renewable Energy
W	Watt
WACC	Weighted Average Cost of Capital
WB	World Bank

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DATASHEET

BASIC INFORMATION

Country(ies)	Project Name	
East Asia and Pacific	Accelerating Sustainable Energy Transition Program	
Project ID	**Financing Instrument**	**Environmental and Social Risk Classification**
P181555	Investment Project Financing	Substantial

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
[ ] Alternate Procurement Arrangements (APA)	[✓] Hands-on Enhanced Implementation Support (HEIS)

Expected Project Approval Date	Expected Project Closing Date	Expected Program Closing Date
24-Sep-2024	30-Jun-2029	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

Proposed Project Development Objective(s)

To help accelerate renewable energy scale up in the ASEAN countries, including through regional power trade.

Components

Component Name	Cost (US$, millions)
Regional Renewable Energy Policy Support and Climate Financing	1.50
Regional Power Trade	1.70
Knowledge Sharing, Consultations, and Capacity Building	1.80

Organizations

Borrower:	ASEAN Centre for Energy
Implementing Agency:	ASEAN Centre for Energy

MPA FINANCING DETAILS (US$, Millions)

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)

SUMMARY

Total Project Cost	5.00
Total Financing	5.00
of which IBRD/IDA	5.00
Financing Gap	0.00

DETAILS

World Bank Group Financing

International Development Association (IDA)	5.00
IDA Grant	5.00

IDA Resources (in US$, Millions)

	Credit Amount	Grant Amount	SML Amount	Guarantee Amount	Total Amount
East Asia and Pacific	0.00	5.00	0.00	0.00	5.00
Regional	0.00	5.00	0.00	0.00	5.00
Total	**0.00**	**5.00**	**0.00**	**0.00**	**5.00**

Expected Disbursements (in US$, Millions)

WB Fiscal Year	2024	2025	2026	2027	2028	2029
Annual	0.00	0.50	1.00	1.50	1.50	0.50
Cumulative	0.00	0.50	1.50	3.00	4.50	5.00

INSTITUTIONAL DATA

Practice Area (Lead)

Energy & Extractives

Contributing Practice Areas

Climate Change, Environment, Natural Resources & the Blue Economy, Finance, Competitiveness and Innovation, Social Sustainability and Inclusion

Climate Change and Disaster Screening

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

SYSTEMATIC OPERATIONS RISK-RATING TOOL (SORT)

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

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 Standards Relevance Given its Context at the Time of Appraisal

E & S Standards	Relevance
Assessment and Management of Environmental and Social Risks and Impacts	Relevant
Stakeholder Engagement and Information Disclosure	Relevant
Labor and Working Conditions	Relevant
Resource Efficiency and Pollution Prevention and Management	Relevant
Community Health and Safety	Relevant
Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	Relevant
Biodiversity Conservation and Sustainable Management of Living Natural Resources	Relevant
Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities	Relevant
Cultural Heritage	Relevant
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 Covenants

Sections and Description

ACE shall, by no later than ninety (90) days after the Effective Date (or such other date agreed with the Association in writing), put in place and thereafter maintain the following key staff within the Project Management Unit, each with terms of reference, qualifications and experience satisfactory to the Association: (a) a Project Coordinator; (b) a monitoring and evaluation specialist; (c) a financial management specialist; (d) a procurement and contract management specialist; (e) an environmental and social standards specialist; (f) Project officers; and (g) other consultants as needed (Section I.A.1 of Schedule 2 to the Financing Agreement).

Sections and Description

ACE shall, by not later than ninety (90) days after the Effective Date (or such other date agreed with the Association in writing), adopt the Project Operations Manual as accepted by the Association. ACE shall thereafter ensure that the Project is carried out in accordance with the Project Operations Manual, and except as the Association may

otherwise agree in writing, ACE shall not amend or waive, or permit to be amended or waived, any provision of the Project Operations Manual (Section I.B of Schedule 2 to the Financing Agreement).

Sections and Description
ACE shall prepare and furnish to the Association, by not later than three (3) months after the Effective Date (or such other date agreed with the Association in writing) and November 1 of each year for every subsequent year during the implementation of the Project (or such other interval or date as the Association may agree), for the Association's review and approval, an Annual Work Plan and Budget (Section I.C of Schedule 2 to the Financing Agreement).

Conditions

I. STRATEGIC CONTEXT

1. This Project Appraisal Document (PAD) covers phase one of the Accelerating Sustainable Energy Transition Multi-Phase Programmatic Approach (MPA), or program, in the East Asia and Pacific (EAP)[1] region. Achieving the vision of ending extreme poverty and boosting shared prosperity on a livable planet is predicated on implementing a sustainable and affordable transition to a low-carbon economic growth path. To achieve this objective, the transformation of the region's energy systems from fossil fuels to renewable energy (RE) will be essential to decarbonize the economies and to facilitate more jobs, enhanced livelihoods, and resilient development.

2. The proposed MPA sets an ambitious program to support the energy transition by accelerating the deployment and grid integration of RE in a region that has the highest greenhouse gas (GHG) emissions in the world and is heavily vulnerable to climate impacts. The proposed program integrates key elements of the new vision expressed in the World Bank's Evolution Roadmap to deliver solutions and impact at scale. It also responds to the urgency of implementing climate mitigation and adaptation efforts by increasing the World Bank's ambition, knowledge, and financing support. The program proposes a financing envelope of US$2.5 billion from the International Development Association (IDA) and the International Bank for Reconstruction and Development (IBRD) to enable the development of 2.5 gigawatt (GW) of new RE generation, resulting in enhanced resilience in energy services and a reduction of 60 million metric tons of carbon dioxide equivalent (CO_2eq). To achieve its objectives at least cost, the program will leverage regional and globally tested approaches to overcome policy and regulatory constraints, facilitate the deployment of large-scale infrastructure investments, and mitigate risks to private sector participation. With a strong focus on regional cooperation and private capital mobilization, the proposed MPA would deploy IBRD in a manner that supports International Finance Corporation (IFC), and Multilateral Investment Guarantee Agency (MIGA) country engagements and instruments to draw on the resources and know-how of the private sector to meet energy transition targets at speed and affordable cost.

A. Regional Context

3. Economic growth in EAP has been strong over the past 15 years, driving energy consumption and growing reliance on fossil fuels. Developing EAP accounts for 28 percent of global primary energy demand and about 59 percent of global coal consumption.[2] Rapid industrialization coupled with urbanization has contributed to a 130 percent expansion of total energy production over the past 20 years. Demand growth has been supported by an increased use of fossil fuels, particularly coal. Abundant and low-cost fossil fuel supplies have driven both local and national economies. As electricity demands are expected to grow by 50 percent by 2030[3] alongside continued improvement in living standards and economic growth, the ability to serve this demand with RE at the least cost will determine countries' success in decoupling emissions from economic growth, strengthening competitiveness, and setting a robust path for low-carbon economic development.

4. The energy transition in EAP is imperative to meet global and regional climate mitigation and adaptation goals. Countries in EAP account for 36 percent of the total global GHG emissions, of which 27 percent is from China. Power and heat generation accounts for about 50 percent of GHG emissions. Between 2000 to 2020, GHG emissions in EAP tripled from 3.94 (2000) to 12.35 gigatons CO_2eq (2020), representing two-thirds of the total growth in emissions globally.[4] EAP's high degree of vulnerability to climate change requires that investments in energy systems not only

[1] The developing EAP region is defined by the World Bank's operational presence.

[2] U.S. Energy Information Administration (2020), as of 2018.

[3] China, Indonesia, the Philippines, and Viet Nam are expected to increase from 8.4 million gigawatt-hour (GWh) (2020) to 12.6 million GWh (2030).

[4] Production of coal and coal products increased from 32 (2000) to 98 million terajoules (TJ) (2020) in the region, as per the International Energy Agency, 2022.

produce lower carbon emissions but also build resilience. More than half of the annual losses from natural disasters worldwide occur in EAP amounting to about US$50 billion in 2021. Without major adaptation efforts, flooding alone could lead to losses of 5 to 20 percent of GDP by 2100 in China, Indonesia, the Philippines, and Viet Nam.[5] Pacific Island countries (PICs) face unique climate vulnerabilities to increased intensity and frequency of cyclones and sea-level rise, and because their reliance on high-cost imported diesel for electricity supply exposes the entire economy to volatile prices and even localized disruptions in fuel shipments. Extremely high electricity costs in PICs make RE imperative not only for resilience but also for affordability and competitiveness.

5. Amidst rapid change in the global energy landscape, many EAP countries have committed to carbon neutrality. China is committed to peak carbon emissions by 2030 and reach net-zero by 2060. Viet Nam and Indonesia have pledged to achieve net-zero carbon emissions by 2050 and 2060, respectively. Cambodia, Lao People's Democratic Republic (PDR), and Fiji aim to reach net-zero emissions by 2050. In addition, Viet Nam has committed to reducing GHG emissions by 8 percent by 2030, Indonesia by 31.89 percent, and the Philippines by 70 percent, compared to the business-as-usual case, under their respective revised Nationally Determined Contributions (NDCs). The ability to achieve energy resilience and carbon neutrality goals, as laid out in NDCs and net-zero strategies, will be determined by actions in the near-term to scale deployments of RE to replace heavy reliance on coal for power generation in the East Asian countries and diesel in PICs.

B. Sectoral and Institutional Context

The imperative for scaling up renewable energy

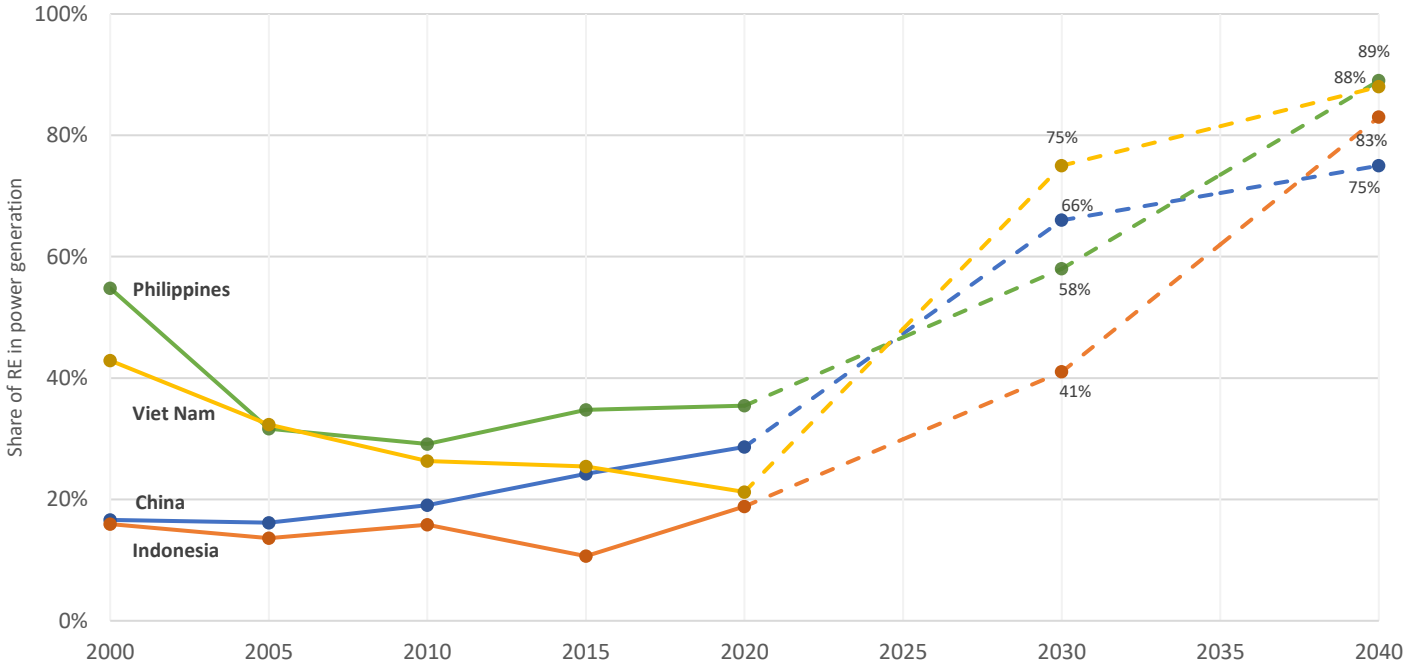
6. Decarbonizing the power sector is the most important first step to reach carbon neutrality as electricity supply has become increasingly reliant on fossil fuel and other hard-to-abate sectors (industrial, transport, and building/heating) would first need to be electrified. To reach net zero targets, countries need to accelerate the decarbonization of their power sector with RE and energy storage technologies at least cost to provide affordable and reliable electricity supply and enable, in the medium to long term, the electrification of hard-to-abate end-user sectors such as industry, transport, and buildings/heating. For PICs, increasing RE use represents a cost-effective alternative to decrease their high reliance on oil which accounts for about 80 percent of their energy consumption of which 80 percent is used for power generation. Decarbonization is, however, hampered by a fast-growing electricity demand, the need of firm power capacity to ensure reliability of power supply, and a large stock of fossil fuel generation. The region has 1,211 GW of operating coal-fired power plants, 57 percent of the global total, with China operating 90 percent of the region's fleet. While over the past decade renewable electricity supply has grown twice as fast as total demand, the share of coal power generation in the electricity mix remains stubbornly high for most countries in the region at 59 percent.

7. Progress on RE development has varied greatly across the region: China and Viet Nam have rapidly scaled RE deployment while other EAP countries have fallen below expectations. Today, RE is already the lowest cost power supply option and reached cost parity with coal power plants in many countries like China and India. China has installed more solar and wind capacity than the rest of the world combined, at the pace of 105 GW in 2021, 123 GW in 2022 and 293 GW in 2023, reaching overall 1,050 GW by the end of 2023. Viet Nam developed over 20 GW of solar photovoltaic (PV) before the pandemic, including a significant share of rooftop PV, and wind power with massive private capital mobilization, however, the pace has significantly slowed down since 2020 due to regulatory and institutional constraints to investments flowing into the power sector. Capacity additions in other countries in EAP have been much slower. Between 2017 and 2022, only 170 MW was added in Indonesia, 475 MW in the Philippines, and 540 MW in Thailand, and even less in other countries.

[5] World Bank, 2023. Reviving Growth. World Bank East Asia and the Pacific Economic Update, April 2023: https://rb.gy/3863s7.

8. While EAP countries have set ambitious RE targets in the power sector, most of them need to further accelerate RE development in the next decade to achieve their targets. China's RE accounts for more than half of installed power capacity and 30 percent of generation, while its NDC target of 1,200 GW from solar and wind by 2030 is expected to be achieved five years ahead of time. In Indonesia and Viet Nam, RE accounts for about 20 percent each, predominantly hydro and geothermal (in the case of Indonesia), and they aim to increase RE's share in the power generation mix up to 48 and 25 percent respectively by 2030. The Philippines reached 35 percent power generation from RE, also dominated by hydro and geothermal. The RE targets are broadly consistent with analysis in the Country Climate and Development Reports (CCDRs) suggesting that collective RE capacity needs to increase ten-fold by 2040 for Indonesia, Viet Nam, and the Philippines. Figure 1 below illustrates the sharp acceleration in the deployment of RE needed in the short-term to support decarbonization of the power sector in the region.

Figure 1: Actual and expected share of RE in the power generation mix in selected EAP countries



Note: Projections as per recently published CCDRs.[6]

9. Increased regional power trade also has the potential for improving reliability, affordability, flexibility, and reducing the carbon intensity of electricity. A larger power system has greater inertia, a more diverse range of complementary resources and potentially higher quantum of ancillary services to manage system security. It is therefore more capable of absorbing intermittent renewable energy generation and thus regional interconnection is an important part of increasing the renewable energy mix of a system. Efforts under the Greater Mekong Subregion and the Association of Southeast Asian Nations (ASEAN) were initiated in the early 1990s with the aim to integrate Southeast Asian power grid systems. Since then, progress was achieved by implementing bilateral power exchanges, although traded volumes remain low. Only about 2 percent of total energy consumption in the region is traded through bilateral contracts. Multilateral power trade can bring economic benefits, reduce the need for additional investments in domestic power generation, and provide an alternative clean energy source for countries that may otherwise develop fossil fuel-based power plants, as illustrated in Box 1.

[6] Historical data from the International Energy Agency (2022, as reported on the SDG7 Tracking website). Projections for 2030 and 2040 correspond to the Accelerated Decarbonization Scenario, as per the recently published CCDRs (Indonesia, the Philippines, and Viet Nam).

Box 1: Benefits of power trade among ASEAN countries

Power trade among ASEAN countries can bring economic benefits from deferment or avoidance of investments in domestic power generation for the region and provide an alternative clean energy source. For example, there are significant hydropower development opportunities in Lao PDR and Myanmar that could be traded to reduce cost, emissions, and enhance reliability of the interconnected power systems. Analysis conducted by the World Bank (2019)[7] estimated that regional integration in ASEAN members could achieve savings of US$1.6 billion (in net present value (NPV) terms) while realizing carbon emission reduction potential of 7 percent by 2035. Although development has been ongoing for over 20 years, only about two percent of total energy consumption in the region is traded through bilateral contracts, and the first multilateral contract among Lao PDR-Thailand-Malaysia-Singapore became operational in 2023.

Although there has been significant cost reduction in RE technologies – carbon emission reduction commitments made by the countries and potential credible off-takers in the region have renewed interest – significant barriers remain: (i) high up-front investment cost; (ii) lack of coordination in system planning and technical standards as well as transmission constraints within each country that will limit cross-border trade; and (iii) lack of political buy-in to trust, coordinate, collaborate and make trade-offs at the regional level.

The World Bank has recently launched "Interconnections and Power Trade Options with Lao PDR", an advisory work based on requests from interested countries to explore technical and commercial options for regional power trade. The study focuses on the near-term low-carbon trade opportunities between Lao PDR, Cambodia, Thailand, and Viet Nam and identifies cross-border interconnections, domestic investment requirements to reinforce domestic grids especially within Lao PDR and Cambodia, and development of a more efficient regional power trade model over bilateral agreements.

Constraints to scaling up renewable energy

10. Challenges to large-scale RE deployment vary across the region. Energy resource endowments, development of the domestic electricity infrastructure, and economic growth, among others, set the initial conditions for the low-carbon power sector transition. Constraints, however, that are common across countries include: (i) lack of adequate policy, market, and institutional frameworks; (ii) under-developed network infrastructure; and (iii) limited commercial financing in low-carbon technologies. The workforce will also need to be upgraded with relevant skills to prepare for the transition, including with more women in technical and managerial roles, or as entrepreneurs and business owners. A summary of the main challenges for Southeast Asian countries and for PICs is presented below.

11. In Southeast Asian countries, there is an urgent need to reduce the cost of RE generation and better integrate it to the grid to accelerate RE scale-up to phase down fossil fuels. While RE is already the cheapest power supply option in many parts of the world, unit costs of electricity from solar PV and wind are still more expensive than the fossil fuel alternatives in most Southeast Asian countries.[8] Key constraints explain this situation. *The policy and institutional framework* must evolve to put in place effective RE pricing policies, implement competitive procurement of RE, reduce payment risks and ensure grid access to bring down the costs of RE to reach grid parity with fossil fuels and attract private sector investments. Important Southeast Asian markets including Viet Nam, Indonesia, the Philippines, Mongolia, Cambodia, or Lao PDR have not implemented RE actions at scale. *On the infrastructure side*, power network constraints to absorb and enable adequate management of the variability of RE have become an important impediment to the transition. For example, Viet Nam is experiencing high curtailment of RE after a rapid scale-up in 2020 and 2021, as the main transmission line connecting its central and south regions does not have sufficient capacity and distribution

[7] Ricardo Energy and Environment (together with Intelligent Energy Systems and Nordpool Consulting). 2019. "Greater Mekong Subregion Power Market Development." Final report prepared for the World Bank.

[8] In 2021, it was estimated that the Levelized Cost of Electricity (LCoE) in Southeast Asian countries, except for Viet Nam, was between US$0.05-0.075/kWh for solar PV, compared to global average of US$0.048 /KWh and fossil fuel alternatives starting at about US$0.05/KWh. Renewable Energy Outlook for ASEAN Towards a Regional Energy Transition. IRENA and ASEAN Centre for Energy (2022).

system capacity is unable to accommodate excess solar power from rooftop PV. Power networks do not have enough flexibility to address RE integration issues, nor a well-developed power market to incentivize the provision of system flexibility. In Indonesia alone, network investments to meet RE targets are estimated at US$50 billion by 2040.[9] Finally, *commercial financing in low-carbon projects* has not materialized at the scale required. Risk-balanced power purchase agreements are crucially missing in some markets such as Viet Nam and off-taker risks are still perceived to be high due to financial viability concerns of the power utilities due to below-cost tariffs in countries such as Lao PDR. The domestic banking sector is still reluctant to offer non-recourse project financing. Limited access to financing in domestic markets and power sector revenues priced in local currencies further exacerbate concerns over currency mismatch and foreign currency convertibility.

12. In PICs there is a significant opportunity to deploy RE as an alternative to fossil fuel-based power generation to reduce costs, improve access to electricity, and increase the resilience of energy services to climate change. Against the backdrop of high reliance on fossil fuels, most PICs have set targets to reach 100 percent of power generation from RE over the next decade, although from different starting points. In 2021, RE penetration ranged from around 4 percent in Palau to 70 percent in Vanuatu, however, *policies* are still nascent, and *institutions* remain weak to implement the transition. Examples include inadequate frameworks for independent power producers (IPPs) and low institutional capacity for power sector planning and project implementation. Existing oil generation assets make it difficult to justify investments that require mobilization of additional financing, even if RE is more attractive on a lifetime basis. Although electricity tariffs are high in PICs, they are often set below cost recovery, making investments unviable. Outdated *power infrastructure* results in low electrification rates, reaching only about 20 percent in Papua New Guinea (PNG) for example. If financing barriers can be overcome, RE is attractive for further development of off-grid systems to provide electricity services to geographically dispersed populations without dependence on transporting fuel over long distances. Increasing severity of cyclones compounds sea-level rise, which can increase power outages and prolong recovery times. *Accessing financing*, both public and commercial, is one of the main constraints as PICs continue to strengthen their economies and manage the risks of debt distress. Risk mitigation instruments and selective deployment of concessional financing will be required to attract investments and lower financing costs.

C. Relevance to Higher Level Objectives

13. The proposed MPA will implement key elements of the World Bank's vision to increase access to affordable, reliable, sustainable, and modern energy, by scaling up clean energy, phasing down fossil fuel use, and supporting a just transition. This is in line with the Sustainable Development Goal (SDG) 7 objectives and aims to realize energy transition in line with the Paris Agreement through the following pillars: (i) scaling up energy efficiency; (ii) expanding and improving access; (iii) increasing RE integration; and (iv) decarbonizing transport. The proposed MPA focuses on the objectives most relevant to the EAP region, that is increasing RE integration as a precondition to phasing down fossil fuels and supporting the decarbonization of end-user sectors, including power. Through the proposed interventions, the MPA will deliver on some of the key results of the World Bank Group related to increases in RE capacity, reductions of GHG emissions, private capital enabled, and new or improved access to electricity. Finally, the proposed MPA would implement a holistic World Bank approach by leveraging expertise and instruments from IFC and MIGA, to structure programs to crowd in and sustain private sector investment.

14. RE development and the need to scale up investments is a high priority in the EAP region, as illustrated in all Country Partnership Frameworks (CPFs). All the latest CPFs for EAP countries that would participate are aligned with the objectives of the proposed MPA: all mention the critical role of RE and the importance of scaling up investments to achieve one or more CPF development objectives. For larger economies, such as Indonesia, CPFs emphasize how scaling up RE is central to promoting greener growth and transitioning to a lower-carbon energy path, in line with country NDCs.

[9] Indonesia Just Energy Transition Partnership. 2023. "Comprehensive Investment and Policy Plan." November 2023.

CPFs also emphasize addressing challenges and risks associated with RE development – such as ensuring grid integration and managing environmental and social impacts. The proposed MPA would also implement key recommendations from recently completed CCDRs for Indonesia and Cambodia[10] which highlight the need for policy and regulatory reforms, capacity building, and targeted risk-reducing investments. For the smaller economies, such as the PICs, where increasing access to electricity remains an important development objective, CCDRs identify scaling up low-cost and reliable RE sources as a crucial element of both the basic service delivery and economic recovery agendas. The CCDR for the Pacific atolls (Tuvalu, Republic of the Marshall Islands, and Kiribati) is currently under preparation.

15. The proposed MPA is consistent with EAP countries' national and regional climate strategies. On mitigation, the MPA will directly contribute to: (i) investments in electricity grid upgrades to improve grid stability, modernization, flexibility, and storage; (ii) improve supply and demand management through reduction in transmission and distribution (T&D) grid losses; (iii) expansion of on-grid and off-grid RE power generation; (iv) policy development support for long-term RE implementation; (v) legal and regulatory framework development for RE integration, promotion of RE investments, and bringing in private capital; and (vi) access and mobilization of climate finance. These activities are critical to achieving EAP countries' carbon neutrality goals in their respective Long-Term Strategies (LTSs). On adaptation, the MPA will directly contribute to key priorities in respective National Adaptation Plans (NAPs), specifically in increasing energy resilience, particularly in PICs, through: (i) diversification of energy generation and distribution options, including hybrid RE mini-grids; and (ii) improvement in grid reliability – ensuring that infrastructure remains resilient to growing risks from climate hazards.

16. The MPA will build strategic partnerships and strengthen regional collaborations with the ASEAN Centre for Energy (ACE) through IDA Regional Grant-funded technical assistance (TA) and capacity building. The MPA is consistent and supports the implementation of ACE's strategy and vision on low-carbon development. It has recently released its Strategy for Carbon Neutrality designed to complement the ASEAN Member States' national initiatives in meeting their respective NDCs, reinforcing the commitment to advance RE integration and the development of the ASEAN Power Grid. This collaboration will also support and facilitate efforts to strengthen the carbon market readiness of participating countries, through common but customized approaches (detailed in Annex 1). The TA project will also help identify capacity gaps in countries participating in the MPA and support targeted capacity-building activities.

17. The proposed MPA will help build the policy and network foundations for a large and rapid scale-up in clean energy development, which will be driven by private capital facilitation. There will be substantial private capital mobilization (PCM) where there is co-financing of RE and energy storage projects by private entities. The MPA will seek to scale PCM in the energy sector: this could come in the form of private investment in on-grid RE generation, distributed energy resources (such as solar rooftop) or charging stations. In some contexts, there may be opportunities for public-private partnerships (PPPs) and concessions for transmission investments with private capital. Projects without direct PCM but which target binding constraints to private investment could be tagged as Private Capital Enabled (PCE), if there are private investments enabled within three years of the project's closing date. This could be the case for those projects which support systems planning that identify least-cost RE generation options that would be developed by private investors, technical assistance to inform private-led grid strengthening investments that would enable improved integration of RE, or sector policy reforms and market design that could improve the enabling regulatory environment for increased commercial financing in the sector. The MPA will report both PCM and PCE, with country projects under the MPA reporting them as per their individual project design requirements. Overall, the MPA aims to mobilize US$1.5 billion (PCM) and enable US$100 million (PCE) for RE scale-up projects in the EAP region. Progress towards meeting these targets will be monitored through two intermediate MPA indicators: private capital mobilized (in US$) and private capital enabled (in US$).

[10] Published CCDRs are available online: www.worldbank.org/en/publication/country-climate-development-reports.

D. Multiphase Programmatic Approach

Rationale for using an MPA

18. The MPA will create a financing and knowledge vehicle to accelerate the adoption of RE at scale for power generation and in end-user sectors across EAP countries. A programmatic engagement would signal the World Bank's long-term commitment and increased ambition to help countries achieve the necessary speed and scale to make an impact in their transition pathways. The MPA is also expected to bring substantial benefits to supporting a coordinated and long-term engagement across EAP countries and would make the achievement of the program development objective (PrDO) more likely and effective, compared to using stand-alone projects. The main benefits of the MPA include:

a. ***Increase the scalability of impacts of World Bank knowledge and financing support through replicable interventions*** to tackle the global challenge of reducing GHG emissions. Specifically, the MPA will support RE deployment in the power sector, focusing on proven RE technologies, tested approaches to RE procurement, scalable approaches to blending carbon or climate finance with private capital for RE scale up, and tailored design of grid infrastructure to mitigate technical risks of intermittent clean generation, among others. For example, projects in phase one in the Pacific will benefit from scalable approaches to develop RE enabling infrastructure and will inform the development of subsequent phases.

b. ***Use common approaches to reduce preparation and implementation transaction costs*** and facilitate harmonization, simplification, and standardization of World Bank processes. These are expected to result in both reduced preparation time and enhanced implementation support. Examples include standard technical information (for example, equipment technical specifications, measurement, and verification protocols) and documents (such as operation manuals, technical standards, bidding documents for RE auctions, terms of reference (ToRs) for environmental and social assessments)). Options to standardize documentation will be implemented, especially relevant for procurement, environmental and social safeguards, and monitoring and evaluation. Such harmonization and standardization would still allow for sufficient country customization given the enormous diversity of EAP countries.

c. ***Leverage regional institutions and global knowledge to undertake an ambitious regional coordinated effort, build capacity, and foster the learning agenda.*** The MPA will work with ACE to accelerate the implementation of regional integration investments that would unlock significant low-carbon resources and to deepen the knowledge agenda and support capacity development of national entities. The MPA will leverage ACE's institutional set-up, technical knowledge, and convening power to create a *catalyzing platform* for the implementation of key activities in the MPA. ACE and participating countries will also benefit from global knowledge delivered by the World Bank through a series of technical academies with the objective of strengthening client capacity, facilitating learning between countries and regions, and ensuring that learning is captured methodically throughout the various MPAs being deployed globally. During MPA implementation, other regional partnerships will also be explored.

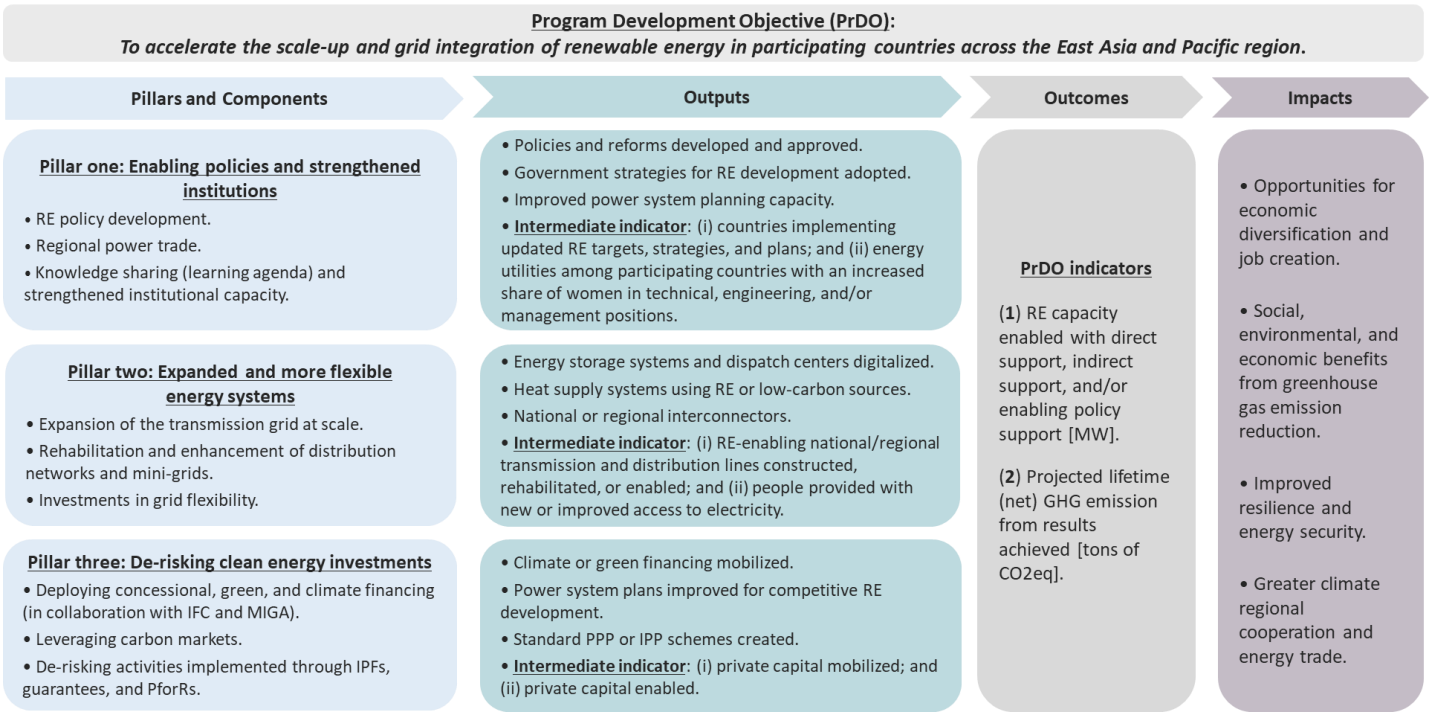
II. PROGRAM DESCRIPTION

A. Program Development Objective

19. The proposed MPA program development objective (PrDO) is to accelerate the scale-up and grid integration of renewable energy in participating countries across the East Asia and Pacific region.

20. The program results chain shown in Figure 2 reflects the outcomes, including how the program's activities contribute to delivering global public goods, including GHG emissions reduction, and the range of expected long-term impacts.

Figure 2: Accelerating Sustainable Energy Transition Program results chain (theory of change)



Key assumptions: continued commitment of client countries to their national targets and policy frameworks, institutions strengthened under the proposed MPA remain empowered and resourced, infrastructure upgraded under the proposed MPA are properly operated and maintained, and that the countries maintain relatively stable macroeconomic conditions.

B. Indicators and Results Chain

21. To monitor the achievement of results, the proposed PrDO indicators include: (i) RE generation capacity enabled with direct support, indirect support, and/or enabling policy support [MW];[11] and (ii) projected lifetime net GHG emissions from results achieved [metric tons of CO_2eq].[12] Both indicators are aligned with the Corporate Scorecard. The detailed assumptions used for calculating, monitoring, and evaluating the indicators are presented in the results framework (monitoring & evaluation plan).

Table 1: PrDO-level Outcome Indicators

Indicators	Unit	End target
Renewable energy capacity enabled with direct support, indirect support, and/or enabling policy support	MW	2,500
Projected lifetime net GHG emissions from results achieved	tCO_2eq.	-60,000,000

[11] Defined in the corporate scorecard as gigawatt (GW) of installed renewable power generation enabled by World Bank Group-financed operations. RE is defined to include hydropower and power from wind, solar, geothermal, and other renewable sources.

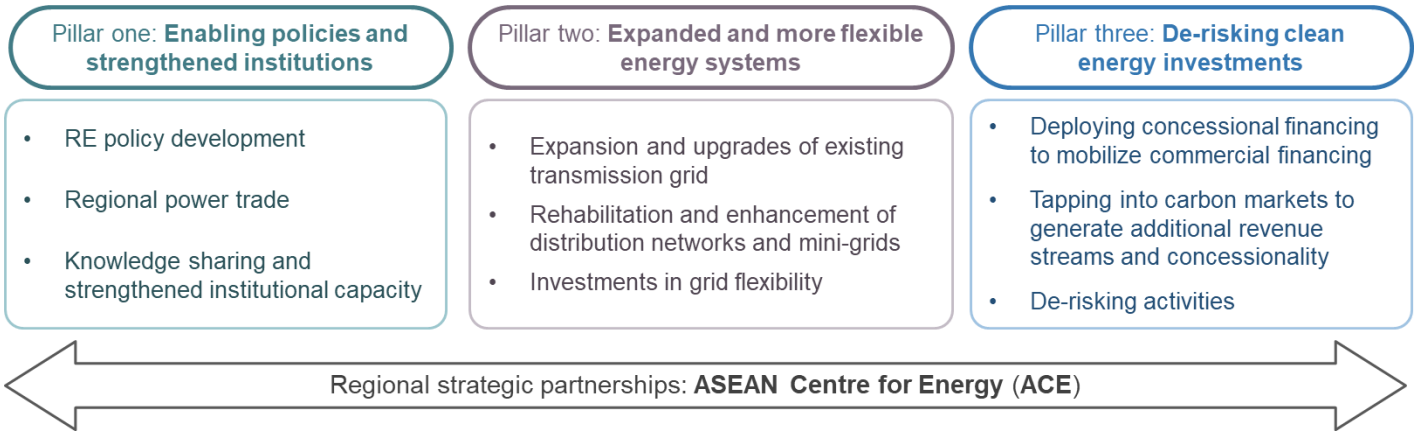
[12] Defined as aggregate GHG emissions reductions for projects that apply GHG accounting. Contributions relate to project net GHG emissions calculated as the cumulated difference between project gross (absolute) emissions aggregated over the economic lifetime of the project and the emissions of a counterfactual or baseline aggregated over the same horizon.

22. Intermediate indicators include: (i) RE-enabling national or regional T&D lines constructed, rehabilitated, or enabled [kilometers]; (ii) private capital mobilized [US$, millions]; (iii) private capital enabled [US$, millions]; (iv) countries implementing updated RE targets, strategies, or plans [number]; (v) people provided with new or improved access to electricity [number]; and (vi) energy utilities among participating countries that have an increased share of women in technical, engineering, and/or management positions [number]. Projects under the MPA will report on the MPA's PrDO indicators and will select relevant intermediary indicators that are appropriate for each operation.

C. Program Framework

23. The proposed MPA has been designed to address critical constraints to RE deployment and is based on extensive and long-standing client engagement in the region. The MPA seeks to invest up to US$2.5 billion from IBRD/IDA financing to be implemented over 10 years (FY25-34) to achieve up to 2,500 MW of new RE capacity developed or enabled and a GHG emission reduction of 60 million metric tons of CO_2eq. The MPA will be anchored in three complementary pillars of activities–enabling policies and strengthened institutions, expanded and more flexible energy systems, and de-risking clean energy investments, as shown in Figure 3.

Figure 3: Accelerating Sustainable Energy Transition Program pillars



24. Complementing and reinforcing MPA activities, the World Bank will continue its long-standing engagement with all the major countries in the EAP region by providing Programmatic Advisory Services and Analytics (PASA) and TA on policy and regulatory reforms to scale up RE, phase down coal, and improve utility performance. The implementation of energy transition-related policy reforms will be supported by complementary World Bank instruments such as country-level and regional advisory services and analytics and TA, and Development Policy Financing (DPF) operations. In addition to analytical work, the World Bank is engaged in substantive policy dialogue on sector reforms. In Indonesia, for example, the World Bank has been leading the policy working group under the Just Energy Transition Partnership (JETP) initiative aimed at identifying and recommending a reform roadmap to enable RE scale-up, coal phase-down, and improve the financial viability of the national utility, PLN. In Viet Nam, dialog on power system planning has informed decisions to increase RE and slow down the growth of coal power plants, and reform the national utility, Vietnam Electricity. Similarly, the PIC countries are also implementing a PASA activity on RE scale-up and utility reforms. During the implementation of the MPA, the Bank will work closely with IFC and MIGA to systematically identify and support the design and implementation of the actions and reforms to improve the enabling environment for private sector investments in RE. Such reforms could be supported under DPF operations in parallel to the MPA.

25. The mobilization of the private sector and facilitation of private capital will play a critical role in achieving the program's objectives. The EAP region is increasingly becoming an attractive investment location, however, little of this investment currently supports the energy transition. The proposed MPA will support private capital facilitation (both

private capital mobilization and enabling) through elimination of barriers described above and by supporting key risk mitigation activities. Instruments may be needed to transfer risks and make long-term contracts more affordable while off-takers continue moving toward financial viability. Considering the programmatic nature of the proposed MPA, single loans can be broken into phases, to match borrowing needs more closely with financing needs. Combining Program-for-Results Financing (PforR), Investment Project Financing (IPF), and Guarantees, would allow countries to integrate public investments, and risk mitigation mechanisms as needed.

26. Furthermore, under the proposed TA project to be implemented by ACE, market sounding will be carried out to identify key barriers to private sector participation and commercial financing mobilization for the energy transition in these countries. It will inform the Bank's engagement in improving the enabling environment and de-risking investment from private and commercial capital under the proposed MPA. Finally, through the Regional Decarbonization PASA (funded by the Energy Sector Management Assistance Program – ESMAP – as well as the Korean and United Kingdom governments), an annual knowledge exchange will be organized to support peer to peer learning and dissemination of innovations in energy transition policies and interventions.

Program pillars

Pillar One: Enabling policies and strengthened institutions

27. Activities under Pillar One will cover a range of issues to ensure that investments in (capacity additions) and use of (dispatch) low-cost and clean energy supply can be scaled-up and that it is not hindered by thermal generation, dominance of market players (including state-owned enterprises, SoEs), or policy distortions that may deter reduction in dispatch. This pillar involves tailored TA and investments. For example, PforRs would help improve country systems for efficiency in procurement and safeguards management and incentivize the implementation of specific actions reflected through appropriate disbursement-linked indicators (DLIs). ACE would also support the delivery of TA activities. Key activities will include:

a. ***RE policy development.*** Activities will support: (i) the development of competitive markets and regulatory reforms, including the design of auctions for RE and the introduction of ancillary services; (ii) design of competitive RE procurement standards, informed by market sounding of RE developers; (iii) formulation of decarbonization strategies and/or roadmaps; and (iv) utility reforms to reduce the off-taker risk and market design reforms to create more competition and innovation.

b. ***Regional power trade.*** Activities will support: (i) assessing options and concrete steps for enhancing regional integration including platforms for system planning and data sharing to take advantage of clean generation options over a wider region to exploit synergies across sectors (for example, heating, electric vehicles, and industrial decarbonization); (ii) options for the technical and operational harmonization (market rules, grid codes, and transmission tariffs) to enable investments in regional electricity trade; and (iii) studies, including pre-feasibility assessments to assess the technical, economic, and financial viability for renewable and cross-border transmission projects.

c. ***Knowledge sharing and strengthened institutional capacity.*** The activity will support the development of a centralized database to serve as a platform for knowledge sharing and collaboration. It would involve collecting and disseminating Geographic Information System (GIS) data on RE potential and environmental and social data that could inform the development of safeguards and procurement documents. Knowledge sharing and building of institutional implementation capacity will be prioritized for all participating countries, including through regional platforms supported under the proposed MPA. Through implementation support provided, institutional capacity of ACE will be enhanced on project management, financial management (including audits and procurement), and environment and social risk management monitoring and reporting. Finally, activities will support gender mainstreaming in power utilities to improve women's employment, career, and leadership

opportunities in the energy sector – thereby advancing gender equality. Such activities would be implemented as a cross-cutting theme under the TA project to be implemented by ACE (Clean Energy and Power Trade Development in Southeast Asia Project).

Pillar Two: Expanded and more flexible energy systems

28. The implementation of the energy transition will require unprecedented growth and upgrade of electricity systems. Availability of funding at that scale is a massive challenge, calling for prioritizing investments that will maximize the most economic clean energy projects. The development of capable and flexible power transmission systems will be supported by IPF and PforR operations. High-voltage and regional interconnection investments would most likely be financed by IPFs while distribution network and other grid flexibility investments could be supported by PforR operations – depending on their technical complexity and expected social and environmental impact. Specific activities to be implemented under this pillar include:

a. ***Expansion and upgrades of the existing power transmission grid at scale*** are required in Indonesia and other countries to address the key constraints to scaling up RE due to transmission bottlenecks and lack of network capacity. This would require expanding and/or building high-voltage transmission networks for long distance inter-region and cross-border power flows (for example, moving to the next level of high voltage from 150 kV to 270/500 kV lines in Indonesia). The MPA will also support transmission projects that go beyond borders that can increase the development and flow of RE in one country to avoid and replace fossil fuel power development in another (see Box 2). These regional interconnection projects are complex and need regional forums that can help put in place guidelines, processes, and modalities to speed up the development of regional interconnectors, markets, and trading arrangements.

b. ***Rehabilitation and enhancement of distribution networks and mini-grids.*** Low-voltage power networks will feel most of the pressure from the transport electrification agenda and distributed energy resources (DER) like solar rooftop. The MPA will support investments in urban areas that require upgrading transformer capacity, adding capacitor and reactor capacity, and replacing the older feeders with higher capacity, which are needed for meeting load growth and reducing system losses, while maintaining the quality of electricity services (frequency and voltage-level stability). In addition, although EAP has high access in most parts, universal access to electricity remains a priority agenda. Access to reliable and clean electricity services is still a key development challenge in Pacific Islands states like PNG (21 percent access rate in 2021) and parts of Federated States of Micronesia (83 percent access rate in 2021). In Indonesia, Cambodia, and Mongolia, last-mile electrification is also still needed. The MPA will also support activities and investments to develop RE use in rural areas, including, for example, providing viability gap funding to develop private-led RE mini-electrification projects.

c. ***Investments in grid flexibility*****.** In addition, investments to enhance the dispatch flexibility and "smartness" of the grid will be supported, including battery energy storage systems (BESS) at both T&D levels co-located with solar/wind projects, supervisory control and data acquisition (SCADA) systems, and modernization of regional/central power dispatch centers (Indonesia and Mongolia).

Pillar Three: De-risking clean energy investments

29. The proposed MPA will provide tactical deployment of concessional financing to mobilize commercial financing and reduce the cost of the transition. In addition to implementing enabling RE policies, project-specific interventions will be needed to further reduce the cost of RE and make projects economically and financially viable. Specific interventions would aim at bringing down the cost of capital, including through blended finance with the private sector. This will be critical to massive scale-up of RE (solar, wind, and biomass) and for the development of flexibility resources including battery storage and the development of large RE-enabling transmission projects, among others.

Box 2: Power transmission, a critical enabler of energy transition

Transmission is a complex industry with fixed costs and long and inherently uncertain implementation periods. Transitioning to cleaner forms of power generation often involves building large-scale solar or wind facilities in resource-rich remote areas away from the main grid and load centers. In turn, connecting these facilities to the grid requires upgrading and modernizing the entire network. Despite its importance, transmission planning has often been neglected in favor of renewable generation or storage –commonly leading to RE curtailment, hindering entry of RE at scale, creating risks for private investment in the sector, and stunting decarbonization.

Whether transmission is viewed and labeled as "green" remains a fundamental issue, with ramifications for capital mobilization for the energy transition. Transmission and network investments are currently only considered "green" if stringent criteria are met (such as having CO_2 emissions intensity below a certain level). This approach precludes sector developments important in developing EAP countries: (i) essential upgrades to the existing network; (ii) expansions to create parallel paths that ensure reliability; and (iii) smart grids that ensure grid security. Considering transmission as a green investment within an energy transition is particularly critical for coal-heavy countries of EAP where strengthened transmission is a necessary condition to unlock and accelerate investment in cleaner sources of power.

To fully achieve decarbonization goals, planning must be long term and co-optimized with green generation plans. A recent World Bank policy research working paper[13] argues that there is a strong case for a broader definition of green transmission and better planning. Transmission networks in these countries, owned by financially weak SoEs, need significant investment if they are to accommodate a high share of RE, including to build at higher voltages, enhance reliability, and integrate communication networks for smart monitoring and control.

30. The proposed MPA will explore opportunities for operations under the MPA to tap into carbon markets to provide additional grant-like revenue streams. The MPA will support the development of carbon market readiness roadmaps based on country-level gaps assessments with the objective of generating and monetizing high-quality emission reduction credits. Activities will include implementation support for the roadmaps, such as the development of a robust emission-reduction credit asset creation infrastructure and piloting result-based climate and carbon finance transactions with World Bank-managed facilities. Support would come through the Transformative Carbon Asset Facility (TCAF) and Scaling Climate Action by Lowering Emissions (SCALE). Both are umbrella multi-partner trust funds to support the generation and monetization of high-integrity carbon emission reductions by providing results-based climate and/or carbon finance (RBC/CF) support. The technical advice and capacity-strengthening support from TCAF and SCALE could help bridge the gap between the supply of, and demand for, high-integrity emission reductions and help unlock additional private sector finance from international carbon markets. The PNG National Energy Access Transformation Project in phase one of the MPA has been identified as a potential candidate for SCALE RBC/CF support. The MPA will also seek to leverage other World Bank-managed trust funds like the Global Infrastructure Facility, and collaborations with the Energy Transition Accelerator to maximize the impacts related to unlocking carbon market support.

31. De-risking activities would be implemented through IPFs, Guarantees, and PforRs. Examples of support include public financing for pilot or PPP projects, payment and termination guarantees to enable private investment (for example, project by project, fund level), credit or guarantee lines with financial intermediaries for distributed energy resources, second level guarantees to allow banks to leverage their capital for RE investments, and PforRs supporting decarbonization milestones related to RE targets.

32. PforRs in subsequent phases of the MPA would support activities in all three pillars and DLIs will include: newly built or upgraded transmission lines; newly built or upgraded substations connected to transmission lines; increased capacity of the distribution grid; increased delivery of electricity to customers; new customers connected to the grid;

[13] World Bank, 2023. “Rethinking the "greenness" of electricity transmission: Embracing a more holistic approach”, World Bank Blogs, July 2023: https://rb.gy/whwz7a.

increased reliability of the distribution grid; additional advanced meters installed and operational; SCADA and Advanced Distribution Management Systems (ADMS) implemented; new or upgraded SCADA systems built and operating; increased implementation capacity for DER; increased integration of rooftop solar PV capacity; increased integration of EV charging stations; new battery storage equipment installed and operating; solar and/or wind power generation capacity installed and dispatched to the grid; private investments mobilized for the deployment of solar, wind and/or battery energy storage system projects; decrease of total GHG emission intensity; and decrease of average regional system generation cost.

Participating countries

33. Under the MPA, eligibility will be flexible to cover all the EAP region, but potential client countries would need to have fundamental sector conditions and demonstrated commitment to embark on the energy transition and RE scale-up. Criteria includes: (i) commitments expressed through policies, plans and/or strategies to meet the country's NDC commitments, particularly in the power sector; (ii) basic regulatory and policy frameworks and implementation capacity for the needed measures/activities; and (iii) stated commitment to mobilize private sector financing for the energy transition over time.

MPA phases

34. In phase one, the MPA includes two country operations – in Papua New Guinea (PNG) and the Republic of the Marshall Islands (RMI) – in addition to the TA project to be implemented by ACE. The development objectives, results indicators, and activities of the country projects are fully aligned with the MPA. Projects included in phase one exemplify challenges facing EAP countries to scale RE deployment, experience of which would be leveraged for subsequent phases. These challenges include: (i) increase access to RE and enhance the reliability of power supply (PNG); and (ii) power network constraints and lack of system flexibility to manage variable RE power generation (RMI). The proposed projects showcase how the Bank is supporting beneficiary client countries address these challenges through a combination of investments and technical assistance.

35. Detailed descriptions of the investment projects in PNG and RMI can be found in Annex 2 and Annex 3 respectively. A summary of each project included in phase one of the MPA is presented below:

a. ***Clean Energy and Power Trade Development in Southeast Asia Project (P181555).*** Through ACE, the proposed US$5 million IDA grant will provide TA to support ASEAN countries to accelerate RE scale-up – including through regional power trade amongst countries in Southeast Asia, supporting primarily pillar one of the MPA. The program has three main activities: (i) regional RE policy support and climate financing – designed to provide analytical support on policy issues and capacity development required at regional level to facilitate development and financing of RE investments; (ii) regional power trade – building upon dialogue and experience that ACE has accumulated based on their ASEAN regional grid concept. This set of activities aims to provide additional technical and analytical support to start transboundary power trade (increasingly RE-based) within Southeast Asia, also including climate-resilient aspects into analyses on grid infrastructure; (iii) knowledge sharing, consultations, and capacity building – ACE will utilize their regional network and access to help consult, disseminate, and provide capacity building to member states and their agencies. This includes promotion and advancement of gender equality in the energy sector workforce – including through technical support to power utilities and establishing internship programs for female technical and managerial staff.

b. ***Papua New Guinea: National Energy Access Transformation Project (P173194).*** The proposed US$200 million IDA IPF, complemented by a US$4.2 million grant from the Global Partnership for Results-Based Approaches Multi-Donor Trust Fund, aims to increase access to energy – including through RE micro-grids – and enhance the reliability of electricity supply. The proposed project will support all three pillars of the MPA. The proposed

project comprises four components: (i) rehabilitation, enhancing the reliability of the national utility's infrastructure (PNG Power Ltd., PPL), and on-grid electrification; (ii) RE micro-grids and rural energy market development for remote communities not served by the grid; (iii) energy sector institutional development to strengthen PPL and National Energy Authority (NEA); and (iv) support to the management of the project.

c. ***Republic of the Marshall Islands: Renewable Energy Generation and Access Increase Project (P181250).*** The proposed US$60 million IDA IPF aims to increase RE generation and improve the reliability and access to electricity services, supporting pillars one and two of the MPA. The project will also strengthen the capacity, including gender inclusion, of key energy sector entities. The project comprises three components: (i) increase in RE generation and network upgrade in main grids; (ii) improve electricity access in outer atolls; and (iii) institutional strengthening and implementation support.

36. Demand from countries to join subsequent phases of the MPA is expected due to increased ambitions to scale-up RE development and regional cooperation opportunities. Countries would include Cambodia (grid strengthening to integrate variable RE and increase regional power exchanges), Federated States of Micronesia (mini-grids and scale-up of RE generation and flexible resources to enable access and enhanced resilience of the power sector), Indonesia (grid strengthening for increased RE penetration), and Mongolia (increase the reliability and capacity of transmission lines to facilitate RE integration). The World Bank has received letters of interest from these governments. The list of operations in subsequent phases is presented in Table 2 on the next page.

D. Program Beneficiaries

37. The main beneficiaries are people in the EAP region accessing cleaner energy services and thus enjoying a cleaner local environment, improved quality of life, and new economic opportunities. Local communities, including cities, will enjoy the accrued benefits of cleaner air while improving the availability and quality of electricity service delivery. Industrial enterprises will see more opportunities to develop and diversify their activities in the green manufacturing supply chains. Utilities will gain from upgraded systems, enhanced system flexibility, and capacity needed to accommodate and manage an increasing share of VRE and distributed energy resources. Other beneficiaries include private sector investors, equipment suppliers, construction and engineering firms, commercial banks, and other private sector providers who will benefit from increased demand for their goods and services, leading to increased employment. Governments will also develop and monetize their large indigenous RE resources and achieve their climate commitments.

E. Rationale for World Bank Involvement and Role of Partners

38. The World Bank has been a consistent partner supporting the decarbonization and access agendas, and the development of environmentally sustainable energy systems in the EAP region. The lending portfolio in the energy sector over FY10-22 was approximately US$6 billion. Interventions focused on supporting RE development have included hydropower, solar PV, and geothermal. Projects also developed and upgraded T&D infrastructure to improve electricity access and reliability as well as security of supply. The wealth of insights gained throughout years of operations and client engagement consolidated the World Bank as a trusted partner, recognized for its willingness to support new technologies and mitigate the risks posed by nascent technologies adoption, particularly in low-income countries. These technologies have now matured and their scale-up is urgently needed. The proposed program would mark a bold institutional commitment towards significantly increasing the World Bank's knowledge and financing support for the energy transition in a medium-term programmatic manner, building on country platforms.

Table 2: List of Operations and Financing Envelope for the Accelerating Sustainable Energy Transition Program

Phase	Project title (project 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	–	Q1 FY25	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	Q1 FY25	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	–	Q1 FY25	Moderate
Later phases [14]	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]	–	–	Q3 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]	Q3 FY25	Substantial
	Indonesia: Grid and Renewable Energy Financing Facility Guarantee (P178788)	*Improve the electricity utility's capacity to raise Sustainability Linked Finance to accelerate Indonesia's energy transition.*	Guarantee	[750.00]	–	–	Q4 FY25	High
	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	–	[70.00]	–	FY25	Moderate
	Mongolia: Third Energy Sector Project (P178190)	*Increase the reliability and capacity of transmission lines to facilitate RE integration.*	IPF	[50.00]	[5.00]	–	FY25-26	Substantial
	Cambodia: Power Grid Strengthening Project	*Enhance the grid to integrate VRE and increase regional power exchanges.*	IPF	–	[260.00]	–	FY25-26	[TBC]
			Totals (US$, millions)	[1,900.00]	[600.00]	[17.20]		
			Grand Total (US$, millions)		**[2,517.20]**			

[14] Operations will be submitted for approval as ready and after meeting requirements of client countries. The order in this list is indicative.

39. The pillars of the MPA systematically address client capacity to envision, design, prepare, and implement ambitious energy transition programs, consistent with the World Bank's approach to energy transitions outlined in *Scaling Up to Phase Down.*[15] Growing the pipeline of bankable RE projects builds on this government leadership and supportive regulatory and policy environment, increasingly capable institutions, and procurement mechanisms that provide transparent price discovery. The proposed MPA furthers the Bank's leadership in supporting client countries to prepare and implement programs instead of stand-alone projects to overcome barriers to scale systematically. The MPA will target concessional resources needed to overcome barriers, including to support enabling environments that mitigate risks, thus catalyzing and leveraging private capital. Blended finance structures that optimally utilize concessional, multilateral development banks (MDBs) and private capital in private sector investment can further mitigate project investment risks and address any remaining viability gaps and improve overall affordability. In addition to working with ACE as a regional platform, the Bank will also partner with international finance institutions and the private sector for the implementation of strategic investments. Specifically, during program implementation partnerships with the Asian Development Bank (ADB) and Asian Infrastructure Investment Bank, among others, will be explored.

F. Lessons Learned and Progress on Learning Agenda

40. The MPA builds upon lessons learned from decades of global engagement in RE by the World Bank Group, through both TA and lending, including Scaling Solar and implementation of ESMAP programs such as the Sustainable Renewables Risk Mitigation Initiative and the Global Geothermal Development Plan. Substantial operational experience over the last decade has informed the approach and sequencing of interventions under this MPA to gradually scale up investments, notably based on the following lessons:

a. ***Successful efforts to expand RE are rooted in strong and consistent government commitment.*** Adopting a long-term vision for RE scale-up is critical to translating ambitions into tangible, executable plans for RE investment and grid and market integration.

b. ***Establishing stable and comprehensive enabling policy and regulatory and institutional frameworks is critical to build investors' trust.*** Enabling frameworks include: (i) improved electricity pricing through strengthening electricity markets and reforming energy subsidies to better support policy goals, with targeted subsidies sometimes required to ensure that high development impact investments materialize; (ii) transparent, least-cost power sector planning, including VRE, to guide sector investment and reduce investor risk; (iii) competitive and transparent procurement processes (auctions or site-specific); and (iv) strong institutions that design, operate, and regulate the power system, ensuring good governance and transparency.

c. ***Harnessing the potential of VRE necessitates substantial expansion and modernization of electrical grids, careful power system planning, and grid management tailored to improve flexibility.*** T&D can be bottlenecks to RE scale-up without the government and/or the utility's financing for grid reinforcement and flexibility.

d. ***Attracting private sector financing must be strategic and systematic.*** In addition to addressing policy, regulatory, and market fundamentals of the energy sector, project-specific risk mitigation measures are often needed to reduce the off-taker risk associated with creditworthiness of utilities, which is a risk in many EAP countries. Foreign exchange is another important residual risk that needs to be addressed.

e. ***Collaboration between governments, MDBs, donors and climate funds play a vital role in RE development and implementation*.** TA to solve technical and regulatory challenges, targeted public investments (for example, pilots, innovative approaches) and existing risk mitigation instruments cover most of the risks and barriers faced

[15] World Bank. 2023. "Scaling Up to Phase Down: Financing Energy Transitions in the Power Sector." Washington, DC: World Bank.

by RE developers. By leveraging donor and climate funds, MDBs can develop instruments to cover residual risks and ensure that barriers preventing RE projects from reaching financial closure are lifted.

41. Throughout the implementation of the proposed MPA, documented lessons learned from projects under implementation will inform the preparation and implementation of operations in later phases. Learning will include technical, economic, institutional, fiduciary, and safeguards aspects. To facilitate this learning, operations under implementation will adopt a methodology (to be regularly updated) to integrate key lessons in their design. This will include the creation of knowledge-sharing platforms, regular implementation workshops, and the commissioning of thematic studies to capture evolving insights. The Clean Energy and Power Trade Development in Southeast Asia Project, to be implemented by ACE, will also facilitate this learning. Periodic assessments of individual projects and the MPA as a whole will help evaluate progress, adapt strategies as needed, and track advancements to ensure the program's objectives will be met.

III. IMPLEMENTATION ARRANGEMENTS

A. Institutional and Implementation Arrangements

42. Country-level institutional and implementation arrangements will follow those established in each respective country project for its RE scale-up and will be described for each phase. Typically, they will involve ministries, utilities, T&D system operators, regulators, and financial intermediaries. When financial intermediary (FI) operations are included, relevant assessments will be conducted as required, and FI risks included in the risk assessment. Each operation will be independently implemented. Detailed descriptions of implementation arrangements for each project under phase one are presented in Annexes 1 to 3.

43. Phase one of the proposed MPA provides unique opportunities for strengthening regional networks to foster learning and capacity building, as well as generating knowledge regarding regional power trade, which can be implemented through investment operations in future phases of the MPA. As mentioned above, the World Bank will partner with ACE to build on, and strengthen, regional networks. ACE has a long-standing and credible record to facilitate and coordinate initiatives, projects, and activities that are aligned with its mandate. ASEAN has recently presented its Strategy for Carbon Neutrality which is designed to complement the ASEAN Member States' national initiatives in meeting their respective NDCs. It recognizes the need to pursue carbon neutrality with utmost urgency to unlock the huge value potential of a green transformation of the region.[16]

One World Bank approach

44. Collaboration with IFC and MIGA will be established at both country and regional levels. In subsequent phases, IBRD, IFC, and MIGA would engage in structured upstream consultations to identify opportunities to leverage synergies for each operation. An example of PCE and World Bank-IFC collaboration is expected in the National Energy Access Transformation Project in PNG under phase one. The operation will allocate up to US$15 million IDA resources to set up a fund for Viability Gap Financing to provide grants for capital subsidies and enable the private sector to invest in RE mini-grid projects with the expected amount of US$8 million. In full collaboration with the World Bank team, the IFC Advisory Team will lead regulatory and transaction advisory support to the government on the fund management,

[16] The ASEAN Strategy for Carbon Neutrality identifies targeted strategies, where regional cooperation is most beneficial to complement the ASEAN Member States' national initiatives. They are to: (i) accelerate green value chain integration; (ii) promote regional circular economy supply chains; (iii) connect green infrastructure and markets; (iv) enhance interoperable carbon markets; (v) foster credible and common standards; (vi) attract and deploy green capital; (vii) promote green talent development and mobility; and (viii) offer green best practice sharing.

pricing regulation, and competitive selection of private developers to develop the mini-grids. Opportunities to work with MIGA were identified for operations in the pipeline in the subsequent phases.

B. Results Monitoring and Evaluation Arrangements

45. Implementation progress and results will be monitored over the course of the MPA implementation period. Indicators for all projects in the MPA will directly contribute to meeting the PrDO targets and will be aligned with the corporate scorecard. The MPA proposes a set of results indicators (described in the MPA's results chain) from which participating countries can select in accordance with their respective programs. These indicators will be tracked individually by project-level implementing agencies (IAs) as outlined in the respective operation annexes and reported through semi-annual progress reporting. The MPA will conduct a mid-term review (MTR) to take a broader assessment of implementation progress and lessons learned to make necessary adjustments. The MTR would provide an intermediate snapshot of implementation experience, compare projected progress and results against actual progress, identify common implementation issues and lessons, and develop a set of proposed revisions and refinements to help ensure the MPA is ultimately able to achieve its PrDO and key indicator targets.

C. Sustainability

46. All operations under the MPA will have sustainability at the core. The projects will undertake investments that can be sustained or scaled up over time, even after individual project implementation periods. This would include transitioning from early public financing to revolving schemes and other sustainable financing mechanisms, and eventually to fully commercial financing. For instance, the Government of RMI has reiterated its commitment to the achievements of its NDC targets, highlighting the need for reliable power supply and the transition to RE. The project supported by the MPA is designed to build capacity and cover existing gaps in the IAs – with an emphasis on environmental sustainability of the infrastructure. In PNG, the National Energy Access Transformation Project will build institutional capacity to address gaps in the regulatory and policy framework in the energy sector. To ensure financial sustainability, the project will directly support the national utility's corporate financial recovery.

47. Gender responsiveness. In the EAP region women are underrepresented in the energy sector workforce. This is especially the case in technical and management positions, both as employees of utilities, energy companies, and ministries and as energy entrepreneurs and business owners.[17] Lessons from the implementation of the Gender and Energy facilities in EAP and other regions point to a few critical gaps underlying women's underrepresentation, including: (i) relatively small pipeline of professional women transitioning from science, technology, engineering, and mathematics (STEM) education fields into the energy sector; (ii) limited systematic collection of gender-disaggregated data on employment; (iii) lack of technical and/or leadership positions and training for women; or (iv) unwelcoming hiring practices and working environments for women, among others.

48. The MPA will help address some of the barriers to women's participation in the energy sector. The operations in phase one of the MPA have concrete actions to advance women's employment and career and leadership opportunities. To complement these project-level efforts, the Clean Energy and Power Trade Development in Southeast Asia Project would consolidate regional efforts to advance gender equality through the following activities: (i) the inclusion of gender indicators in ASEAN's region-wide energy database to systematically collect gender-disaggregated data on employment, retention, and career advancement, among other factors; (ii) establish the EAP chapter of the WePOWER Network, to encourage energy sector utilities, companies, and institutions to take concrete actions to advance opportunities for professional women in the field and provide them with technical support; and (iii) establish

[17] In Mongolia, women represent 28.8 percent of the total workforce of the National Power Transmission Network Company, 27.0 percent of mid- and senior-level engineers and technicians, and only 14.0 percent of middle and senior managers. In PNG, women represent 18 percent of the total number of employees at Papua New Guinea Power Limited and occupy 11 percent of managerial positions.

internship programs for female technical and managerial staff of EAP energy clients at energy companies in Australia, New Zealand, or other donor countries that are leaders and champions on technical aspects relevant to women's employment (for example, engineering, management, and leadership skills). To measure the impact of these actions in narrowing the gap in women's employment in the participating countries, the MPA will monitor the following indicator: *energy utilities among participating countries that have an increased share of women in technical, engineering, and/or management positions (number).*

49. Citizen Engagement. The design and implementation modalities of RE projects inherently rely on extensive citizen engagement and are highly country specific. Proper citizen engagement is critical to secure the interests and rights of local communities and inadequate citizen engagement has led to project cancelation in several countries. For this reason, citizen engagement will be treated at the project level, and all projects in the MPA will have at least one citizen engagement indicator that will monitor progress on upstream engagement prior to, during, and after implementation to create a feedback loop that informs continuous improvement in program implementation and contributes to the learning agenda. RE projects and enabling transmission and grid integration projects, led by government agencies and the private sector, typically begin with initial consultations with relevant communities at a project's design stage. This is important for understanding the community's needs and concerns, as these will directly affect the intervention's effectiveness and sustainability. During implementation of the MPA projects, citizen feedback will be solicited through surveys and stakeholder engagement, as articulated in the country and regional Stakeholder Engagement Plans (SEPs). Survey results will be shared with all key stakeholders, including government agencies and utility or private-sector service providers, and used to take informed corrective actions that will also be communicated as needed. Moreover, country-specific grievance redress mechanisms (GRMs) will be developed and used.

IV. PROJECT APPRAISAL SUMMARY

MPA Program (All Phases)

A. Technical, Economic, and Financial Analysis

50. The economic viability of the proposed MPA was assessed qualitatively and informed by the analytics undertaken as part of the CCDRs. Economic costs include capital expenditures in RE projects, transmission infrastructure to enable the evacuation of RE power; flexibility costs to enable the proper dispatching (avoiding curtailment of RE generation); and costs associated to improved operational practices by utilities (digitalization, automatic control generation, smart-grid technologies to enable a more efficient use of networks). The expected economic benefits of the program include more reliable and efficient power supply and reduced GHG emissions. Additional associated co-benefits include fossil fuel savings, reduced operational costs and exposure to fuel price volatility, and health benefits from reduced air pollution.

51. For projects supported under the MPA, the standard cost-benefit analysis will be used following the World Bank guidelines. The NPV and Economic/Financial Internal Rate of Return (EIRR/FIRR) for the project will be calculated based on the quantification of the stream of benefits and costs associated with the project as outlined above. Least-cost power system optimization will be used to calculate the avoided capital and fuel costs, while expected emission savings will be used to calculate the reduction in social cost of carbon and reduction in power outages. The project annexes present the economic and financial analysis for country projects in phase one of the MPA.

52. The MPA is aligned with the goals of the Paris Agreement on both mitigation and adaptation. Paris Alignment assessments have been conducted for each operation under phase one of the MPA and are reflected in the relevant

annexes to this PAD. Future operations prepared under the program will undertake a Paris Alignment assessment following the relevant Paris Alignment Instrument Methods.

a. ***Assessment and reduction of mitigation risks.*** All activities to be financed by the MPA aim to accelerate RE integration across the EAP region to support low-carbon development and are considered aligned. Specifically, TA components – such as project preparation and transaction support, capacity building for strategy, policy, and action plan development, knowledge and data exchange, and market research and analysis (which will be carried out by ACE) – are universally aligned. Activities supporting the rehabilitation and enhancement of distribution networks and mini-grids, or off-grid electrification based on RE are low risk and will be aligned. Activities supporting hybrid generation of electricity from a renewable source backed up by generation using a fossil fuel is considered to be low risk, provided that fossil fuel generations play only a secondary role and that: (i) RE generation units are well maintained and fossil fuel generation is used only when the amount of RE generated and stored cannot fully meet demand; and (ii) fossil fuel generation is less costly than installing sufficient battery storage to meet the same demand. These will be demonstrated by each country project as applicable to ensure they are aligned. Activities related to the expansion and upgrade of existing transmission grids are universally aligned unless project contexts and conditions require least-cost expansion modeling to demonstrate alignment.

b. ***Assessment and reduction of adaptation risks.*** As mentioned above, the EAP region is highly vulnerable to climate risks, with PICs particularly vulnerable to climate disasters and hazards. Activities supported by the MPA, which will be implemented through ACE are not likely to be materially impacted by climate hazards. Investments in infrastructure under the MPA may be at substantial risk from climate hazards. The residual level of risk is considered moderate, however, given that: (i) proposed activities will enhance the energy resilience and overall climate resilience and capacity to address risks from climate hazards; and (ii) proposed infrastructure investments will conduct thorough feasibility assessments that consider risks from climate hazards. The MPA will also ensure country projects incorporate appropriate measures to the design of each project to reduce relevant risks from climate hazards to an acceptable level – including consideration of impact from possible extreme weather events in power system planning and capacity development, incorporation of applicable climate resilience design and technical specifications in the T&D infrastructure relevant for the country context, and consideration of climate risks in technical studies and policy development, including decarbonizing strategies. Activities on training for capacity building will also ensure that overall adaptive capacity in addressing risks from climate hazards is further enhanced, as appropriate, while ensuring that the institutional framework and applicable systems of the borrower can adequately manage risks from climate hazards. These measures ensure that risks from climate hazards for the MPA and participating countries are acceptable.

B. Fiduciary Assessment

53. Procurement. All procurement activities for IPF operations proposed under the MPA (including recipient-executed trust funds) will be carried out in accordance with the World Bank Procurement Regulations for IPF Borrowers, using the latest version dated September 2023 and future updated versions as applicable (hereafter referred to as the World Bank's Procurement Regulations). The World Bank's Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants (referred to as the World Bank's Anti-Corruption Guidelines, latest update July 2016) will also apply. The IAs for each operation will prepare a Project Procurement Strategy for Development (PPSD) to determine an appropriate risk-based procurement approach to be followed to support the achievement of their respective PDO and deliver the best value for money. Based on PPSDs, the IAs will develop a Procurement Plan for at least the first 18 months of project implementation. The PPSD will be reviewed and agreed with the World Bank before project negotiations. The World Bank will assess procurement capacities of the proposed IAs and agree on appropriate risk mitigation and capacity-strengthening measures to ensure IAs are able to

successfully carry out operations in accordance with the World Bank's procurement requirements. These measures and actions include but are not limited to: (i) intensive training on procurement and contract management, advance procurement, use of external procurement/contract management support consultants; (ii) hands-on expanded implementation support (HEIS) by the World Bank; (iii) experience and knowledge sharing at regional and national levels; (iv) engagement of additional procurement oversights (for example, procurement audits by supreme audit institutions); and (v) governance and transparency assurance action plans. In addition, fiduciary assessments will be required for any PforR operations under future phases. In this case, procurement activities will be carried out in accordance with applicable national procurement processes and procedures. The World Bank will assess PforR program procurement systems to ascertain if the planning, bidding, evaluation, contract award, and contract administration arrangements and practices provide reasonable assurance that the PforR operation will achieve intended results. The fiduciary assessment will identify procurement risks, design mitigation measures, and formulate a program action plan (including procurement-related actions) to be agreed with the Borrower before negotiations and subsequently to be implemented by the IAs during program execution.

54. The use of MPA is expected to facilitate procurement during implementation and help increase procurement efficiencies through (i) regional market studies on potential bidders; (ii) developing regional PPSDs with recommended procurement approaches, green and sustainable requirements, qualifications and evaluation criteria, and key performance indicators (KPIs) for major procurement activities; (iii) establishing regional contractors' databases; (iv) providing regional training; and (v) facilitating knowledge/experience sharing across the countries and developing templates that would be customized for different engagements under the MPA.

55. Financial management (FM). FM arrangements for all operations within the proposed MPA will be assessed in accordance with the Financial Management Manual for the World Bank IPF Operations (issued September 2021). Similarly, the fiduciary assessment for any PforR within the MPA will be conducted in accordance with the PforR Policy and Directive. For each of the IAs, an assessment will be conducted which will include a review of FM arrangements (including planning and budgeting, accounting, internal controls, funds flow, financial reporting, and external auditing) to determine if the proposed arrangements provide adequate assurance on the use of funds for intended purposes in an efficient, economic, and transparent manner. These arrangements within IAs will be documented and agreed by appraisal as relevant for each MPA phase. As noted above, fiduciary systems assessment (FSA) will be conducted for all PforR operations under future phases. The FSA will identify public financial management (PFM) risks, design mitigation measures, and formulate a program action plan (including PFM-related actions) to be agreed with the Borrower before negotiations and subsequently to be implemented by the IAs during program execution.

C. Legal Operational Policies

	Triggered?
Projects on International Waterways OP 7.50	No
Projects in Disputed Areas OP 7.60	No

D. Environmental and Social Safeguards Assessment

56. Environmental and social (E&S). The E&S risk for the proposed MPA is rated as *Substantial*, given the typical E&S risks associated with RE power and transmission investments under all program pillars. The E&S risk classification of the PNG project and the technical assistance to be implemented by ACE is *Substantial*. Activities to be implemented in the RMI project are considered as *Moderate* E&S risk.

57. IPF and PforR operations to be implemented under the MPA are expected to have significant E&S benefits including reduction of GHG emissions, improvements to air quality, improving access to affordable energy, and–in the coal-producing nations–facilitating opportunities for a socially sustainable and equitable (or "Just") transition from reliance on fossil fuels. Key environmental risks and impacts relate to hazardous waste disposal (for example, polychlorinated biphenyl (PCB)-contaminated soils and e-waste), land and groundwater contamination and the implementation of TA activities as well as those more generally associated with civil works (dust, noise, erosion and sedimentation, resource consumption, alternation and disturbance of habitats, waste generation, worker safety). Potential social risks and issues include gender issues, engagement and protection of vulnerable people, local economic impacts created in coal-producing communities as energy generation transitions to RE, land, and community impacts in RE areas of having new investments requiring large areas of land (such as solar, wind farms and new high voltage transmission lines), community safety, equity, and benefit-sharing arrangements. Each country in EAP has very different land tenure arrangements which will likely have significant influence on technical designs, costing, project structuring and other aspects as well as creating potential social risks that will need to be proactively managed. Community engagement will underpin project risk and benefit analysis and will, therefore, form a fundamental part of technical project identification, design, and delivery. Future phases will be assessed based on the risks associated with each operation. E&S instruments will be prepared for each project in accordance with the Environmental and Social Framework (ESF) considering direct, indirect, cumulative, and downstream impacts as well as any risks and impacts from associated facilities. Where appropriate, borrower frameworks will be used to manage E&S risks associated with *Low* and *Moderate* risk projects. For PforR operations included in future phases of the MPA, Environmental and Social Systems Assessments will be developed.

58. Appropriate enhanced mitigation measures on prohibition of forced labor will be developed for each operation under the MPA where solar is core as defined in the World Bank Environmental and Social Framework. For IPF operations where solar is core, the bidding documents will emphasize forced labor risks in the procurement of solar panels and their components and will require that sellers of solar panels to the project will not engage or employ any forced labor among their work force. Bidders will be required to provide two declarations: (i) a Forced Labor Performance Declaration (which covers past performance); and (ii) a Forced Labor Declaration (which covers future commitments to prevent, monitor, and report on any forced labor (cascading the requirements to their own subcontractors and suppliers). In addition, enhanced language on forced labor will be included in the contracts. The Bank will prior review procurements of solar panels and components to ensure that enhanced provisions are used by the Borrower. Procurement and FM procedures will be reflected in the respective Project Operations Manuals. For PforR operations, under subsequent phases where solar is core, enhanced mitigation measures that are appropriate to the project structure will be developed and reflected in project documents (for example, Project Operations Manual, Project Action Plan).

Clean Energy and Power Trade Development in Southeast Asia Project

A. Assessment of ACE to Receive IDA Regional Window Funding

59. Support to ACE through the IDA regional window for the implementation of TA activities meets the IDA regional window eligibility criteria for grants to regional organizations. There are six eligibility criteria for access to IDA grants by regional organizations: (i) it has been confirmed ACE is a bona fide regional organization since it has been established by ASEAN members to facilitate regional economic growth and development by facilitating national, joint, and collective activities on energy in Southeast Asia. ACE has the legal status and fiduciary capacity to receive grant funding and carry out the planned activities; (ii) ACE cannot take on IDA credit as it is not a revenue-generating entity; (iii) the planned activities cannot be easily undertaken as part of national programs – the implementation of the

activities under the IPF TA project must be undertaken at a regional level with consultations and input from across the participating countries as needed. Regional research and TA delivered will then support and inform national actions; (iv) the activities to be financed by the regional IDA grant will be part of coordinated interventions to address the regional objective of accelerating the scale-up and grid integration of RE; (v) grant co-financing is not readily available to ACE from other development partners; and (vi) ACE is an active regional organization with ongoing engagement across ASEAN countries and across issues and supports the strategic objectives of IDA on regional integration.

60. Specifically, the TA project to be implemented by ACE will help strengthen regional integration across EAP, with significant benefits to IDA countries. The TA project (Clean Energy and Power Trade Development in Southeast Asia Project) will support IDA countries in ASEAN in building stronger institutional frameworks, enhancing their capacity for policy making, and improving the implementation of RE scale-up programs. As described above, TA activities are regional in nature since they require coordinated interventions that cannot easily be achieved at the individual country level: the TA project to be implemented by ACE will also focus on regional power trade in Southeast Asia, which would benefit IDA countries such as Cambodia.

B. Fiduciary Assessment of ACE

61. The fiduciary assessment of ACE was completed in March 2024 and concluded that ACE's FM arrangements and procurement capacity are adequate to implement the project.

a. ***Financial Management.*** ACE has no experience implementing World Bank-financed operations but has experience implementing grants from bilateral development partners and international organizations – such as the US Agency for International Development (USAID), United Nations Economic and Social Commission for Asia and the Pacific, United Nations Environment Programme (UNEP), *Deutsche Gesellschaft für Internationale Zusammenarbeit* (German Development Cooperation, GIZ), and the Norwegian Government. The assessment of ACE's FM capacity concluded that it has an adequate FM manual that shall be applied for the project in terms of budgeting, payment process, accounting records, and financial reporting. FM risks may arise from: (i) possible delay in Interim Financial Reports (IFRs) and audit report submission, due to unfamiliarity with the Bank's requirements and an increase in transactions due to the grant amount which is higher compared with the regular amount managed by ACE; and (ii) ACE's internal procedures which allow transfer from project funds to general funds and vice-versa (if the agreements with fund sources permit). Proposed risk mitigation actions include: (i) FM and disbursement training will be provided and an FM consultant will be hired to ensure timely submission of IFRs and audit reports; and (ii) a Project Operations Manual (POM) will be developed that includes a definition of eligible expenditures and adequate FM arrangements to ensure the project funds are used for eligible expenditures.

b. ***Procurement.*** ACE has no earlier experience using the Bank's Procurement Regulations. ACE has Consolidated Rules and Procedures which also outline its own procurement procedures. The Administration and Finance Division reports to the Executive Director and is responsible for the procurement function. Annex 1 details the procurement arrangements, capacity assessment, risks, and mitigation for the IA. ACE generally does not have experience in processing large value and complex procurement activities. The assessment identified the following risks: (i) lack of capacity and knowledge of the Bank's Procurement procedures and documentation; (ii) potential delays in the procurement process due to low quality documentation; and (iii) high workload and handling of multiple functions of the staff in the ACE unit responsible for procurement. Proposed risk mitigation actions include: (i) recruitment of external consultants and training of staff; (ii) capacity building with detailed guidance on procurement and contract management steps in POM; (iii) simplified contract management plan to be developed for monitoring of ongoing contracts. The PPSD outlining the procurement approach and the

activities to be financed under the grant has been completed. There are no large value and complex procurement activities expected under the grant.

C. Environmental and Social Safeguards Assessment

62. The ACE-implemented regional TA (Clean Energy and Power Trade Development in Southeast Asia Project) is classified as *Substantial* environmental and social risk because of the potential downstream impacts from the implementation of TA outputs both with respect to policy and technical studies. In addition, ACE has limited environmental and social risk management capacity with no environmental and social resources within the organization. ACE prepared and disclosed an environmental and social commitment plan (ESCP), a stakeholder engagement framework (SEF) and the draft ToRs to complete a strategic environmental and social assessment (SESA) that will inform any strategy and policy work. The ESCP requires: (i) ACE to ensure that all ToRs are developed in accordance with the ESF and good international industry practice; (ii) all TA outputs comply with good international industry practice; and (iii) ACE nominates an environmental and social risk management focal point and engages environmental and social consultants when needed. The World Bank will provide training and support to the Environmental and Social Focal Points. The ESCP and SEF were disclosed on ACE's website on May 28, 2024, and by the Bank on March 19, 2024.

V. GRIEVANCE REDRESS SERVICES

63. 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 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 because 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 GRS, please visit http://www.worldbank.org/GRS. For information on how to submit complaints to the Bank's Accountability Mechanism, please visit https://accountability.worldbank.org.

VI. KEY RISKS

64. The overall risk rating of the proposed MPA is *Substantial*. Individual country annexes present the country and project-specific risks for investment projects in phase one. For the MPA, the overarching risk is the political commitment in scaling up RE in the region. While global RE capacity has tripled between 2014 and 2022, it appears that the vision on RE scale-up has not yet been fully embraced and adequately presented by many EAP developing countries. The record of fossil fuel-based GHG emissions consistently rising to meet the energy demand undermines the important efforts made in the region to rationalize emissions. International experience over the past decade shows clearly that strong political will and effective RE policies and fundamental sector reforms are the prerequisite to scale up RE. Another risk in the region is the substantial dependence on SoEs to deliver energy services. Continued reforms are needed to strengthen these SoEs to reduce off-taker risk and to create space for the private sector to bring much-needed financing and expertise. This MPA intends to mitigate these risks by providing policy support, TA, and financing RE-enabling grid

infrastructure. Each phase of the MPA is designed to build on the experience of past operations, scale up successful approaches and continually improve designs by integrating lessons. Macroeconomic, Institutional Capacity for Implementation and Sustainability, Fiduciary as well as E&S risks are rated *Substantial* based on the assessment of risks for phase one projects and risks anticipated for future phases. In the initial phase, two country projects are rated *Substantial* (PNG and RMI) – primarily due to sector strategies and policies, institutional capacity for implementation and sustainability, and E&S risks. Considering varied risks in different countries, including institutional and implementation capacity challenges, the overall MPA risk rating is assessed as *Substantial*.

65. The risk rating for the Clean Energy and Power Trade Development in Southeast Asia Project (P181555) is also *Substantial*. While the technical design risk *Moderate*, ACE has limited institutional capacity. ACE has no prior experience in implementing World Bank-financed projects, prompting a *Substantial* fiduciary risk. To mitigate this risk, ACE will recruit external consultants and build the capacity of its staff on procurement Bank processes. The Project's E&S risk is also *Substantial* given the potential downstream impacts with respect to policy and technical studies. To mitigate this risk, the MPA will support ACE in the development and implementation of an E&S capacity building plan.

VII. RESULTS FRAMEWORK AND MONITORING

A. MPA Program (All Phases)

Results Framework

COUNTRY: East Asia and Pacific

Accelerating Sustainable Energy Transition Program

Program Development Objective(s)

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

PrDO Indicators

Baseline	Period 1	Period 2	Period 3	Period 4	Closing Period
Renewable energy (RE) capacity enabled with direct support, indirect support, and/or enabling policy support (Megawatt)					
August/2024	May/2026	May/2028	May/2030	May/2032	May/2034
0	0	0	1,000	1,750	2,500
Projected lifetime net greenhouse gas (GHG) emissions from results achieved (CO_2 equivalent) (Metric ton)					
August/2024	May/2026	May/2028	May/2030	May/2032	May/2034
0	0	0	24,000,000	42,000,000	60,000,000

Intermediate Indicators by Program Pillar

Baseline	Period 1	Period 2	Period 3	Period 4	Closing Period
Pillar one: Enabling policies and strengthened institutions					
Countries implementing updated renewable energy targets, strategies, or plans (Number)					
August/2024	May/2026	May/2028	May/2030	May/2032	May/2034
0	0	0	1	2	3
Energy utilities among participating countries that have an increased share of women in technical, engineering, and/or management positions (Number)					
August/2024	May/2026	May/2028	May/2030	May/2032	May/2034
0	0	0	0	1	2

Pillar two: Expanded and more flexible energy systems					
Renewable energy-enabling national or regional transmission and distribution lines constructed, rehabilitated, or enabled (Kilometers)					
August/2024	May/2026	May/2028	May/2030	May/2032	May/2034
0	0	0	1,000	1,750	2,500
People provided with new or improved access to electricity (Number)					
August/2024	May/2026	May/2028	May/2030	May/2032	May/2034
0	0	0	0	15,000,000	20,000,000
Pillar three: De-risking clean energy investments					
Private capital mobilized (Amount (USD))					
August/2024	May/2026	May/2028	May/2030	May/2032	May/2034
0	0	0	600,000,000	1,050,000,000	1,500,000,000
Private capital enabled (Amount (USD))					
August/2024	May/2026	May/2028	May/2030	May/2032	May/2034
0	0	0	40,000,000	70,000,000	100,000,000

Monitoring & Evaluation Plan: PrDO Indicators

Indicator Name	Definition/Description	Frequency	Datasource	Methodology for Data Collection	Responsibility for Data Collection
Renewable energy capacity enabled with direct support, indirect support, and/or enabling policy support	Power generation capacity from renewable energy (RE) facilities constructed or rehabilitated through operations supported by the World Bank, or enabled through indirect support and/or enabling policy support. Renewable power generation refers to biomass co-generation, wind, geothermal, solar, wave and tidal, and hydropower generation of any capacity.	Annually.	ISRs or ICRs of individual operations under the MPA.	As reported in ISRs or ICRs of individual operations under the MPA.	National implementation agencies of individual operations under the MPA.

Projected lifetime net greenhouse gas (GHG) emissions from results achieved (CO_2 equivalent)	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. Only projects that are estimated to reduce emissions are included. A renewable energy (RE) facilities is a RE-based power generation facility constructed or rehabilitated through an operation supported by the World Bank, or enabled through indirect support and/or enabling policy support. Renewable power generation refers to biomass co-generation, wind, geothermal, solar, wave and tidal, and hydropower generation of any capacity. The counterfactual	Annually.	ISRs or ICRs of individual operations under the MPA. Grid CO_2 emission factors to be derived from the Emissions Factors database from the International Energy Agency, in particular the CO_2 emission factors from electricity generation for world countries (in CO_2 per kWh). Baseline: 2021. Technology-specific assumptions for renewable energy (RE) facilities include:	As reported in ISRs or ICRs of individual operations under the MPA.	National implementation agencies of individual operations under the MPA.

	scenario emissions are those that would be generated in the absence of the RE facility: this can be derived through the grid CO_2 emission factors (national level), in turn defined as the amount of CO_2 released into the atmosphere per unit of energy produced during the generation of electricity.		performance ratio, grid availability, capacity factor, inclined solar irradiation, wind energy production hours, yearly degradation. These assumptions are country and project-specific.		

Monitoring & Evaluation Plan: Intermediate Results Indicators

Indicator Name	Definition/Description	Frequency	Datasource	Methodology for Data Collection	Responsibility for Data Collection
Countries implementing updated renewable energy targets, strategies, or plans	Strategies or plans include forward-looking government-approved documents outlining some or more of the following topics (but not limited to): expansion of the electricity grid, electrification, promotion of renewable energy sources, improvements to energy efficiency, and other	Annually.	Annual reports from the ASEAN Centre for Energy (ACE), ISRs or ICRs of individual operations under the MPA.	As reported by ACE in annual reports; as reported in ISRs or ICRs of individual operations under the MPA.	ACE, National implementation agencies of individual operations under the MPA.

	documents outlining how energy services are reliable and affordable. Renewable energy targets include government-approved time-bound targets for installed capacity of renewable energy (expressed in absolute value and/or as percentage of total energy mix).				
Energy utilities among participating countries that have an increased share of women in technical, engineering, and/or management positions	Number of energy companies (utilities) in countries participating in the MPA that report a positive change (strictly greater than zero) in the share of women they employ in technical, engineering, and/or management roles.	Annually.	ISRs or ICRs of individual operations under the MPA.	ISRs or ICRs of individual operations under the MPA.	National implementation agencies of individual operations under the MPA.
Renewable energy-enabling national or regional transmission and distribution lines constructed, rehabilitated, or enabled	Measures progress in developing, rehabilitating, or enabling electrical power transmission and distribution (T&D) lines that allow or enable transportation of renewable energy or enable integration of renewable energy sources.	Annually.	ISRs or ICRs of individual operations under the MPA.	As reported in ISRs or ICRs of individual operations under the MPA.	National implementation agencies of individual operations under the MPA.
People provided with new or improved access to electricity	The number of people that have received new or	Annually.	ISRs or ICRs of individual	As reported in ISRs or ICRs of individual	National implementation

	improved electricity services through operations supported by IBRD, IDA, IFC, or MIGA. This includes estimates of direct access, inferred access, and improved service, covering the attributes of affordability, reliability, availability, and others as defined under the Multi-Tier Framework for Energy Access. Affordability is considered as the cost of a standard consumption package per year relative to household income and is aligned with SDG7. Data are reported based on results achieved in the reporting year, covering operations of IBRD, IDA, IFC, or MIGA.		operations under the MPA.	operations under the MPA.	agencies of individual operations under the MPA.
Private capital mobilized	The amount of financial resources contributed by private entities alongside a commitment or technical assistance delivery made by IBRD, IDA, IFC, and MIGA. This is defined as financing from a private entity on commercial terms due to the active and direct	Annually.	ISRs or ICRs of individual operations under the MPA.	As reported in ISRs or ICRs of individual operations under the MPA.	National implementation agencies of individual operations under the MPA.

	involvement of World Bank Group leading to commitment. Private entity is defined as a legal entity that is carrying out or established for business purposes and financially and managerially autonomous from national or local government. This does not include sponsor financing.				
Private capital enabled	The monetary value of all potential private investments resulting from IBRD, IDA, IFC, and MIGA interventions, including financing, investment, guarantees and technical assistance, that are: (i) expected to materialize or be measured within three years of project closure; (ii) captured in the results framework or otherwise specified in the project approval documents (e.g., the results indicators or equivalent impact measurement system); and (iii) enabled by these interventions that address binding constraints to	Annually.	ISRs or ICRs of individual operations under the MPA.	As reported in ISRs or ICRs of individual operations under the MPA.	National implementation agencies of individual operations under the MPA.

	private investments whether physical, operational, policy, legal, regulatory, institutional, or related to other enabling environment factors that affect private investment and/or commercial financing.				

B. Clean Energy and Power Trade Development in Southeast Asia Project

Results Framework

COUNTRY: East Asia and Pacific

Accelerating Sustainable Energy Transition Program

Project Development Objective(s)

To help accelerate renewable energy scale up in the ASEAN countries, including through regional power trade.

Project Development Objective Indicators

Indicator Name	PBC	Baseline	Intermediate Targets	End Target
			1	
To help accelerate RE scale up in the ASEAN countries, including through regional power trade				
Updated RE strategies and/or regional integration plans adopted by countries (Number)		0.00	0.00	2.00

Intermediate Results Indicators by Components

Indicator Name	PBC	Baseline	Intermediate Targets	End Target
			1	
Regional Renewable Energy Policy Support and Climate Financing				
Centralized database developed (Yes/No)		No	No	Yes
Inclusion of gender-disaggregated data on employment data as part of the centralized database (Yes/No)		No	No	Yes
Regional Power Trade				
Pre-feasibility studies conducted (Number)		0.00	0.00	3.00
Knowledge Sharing, Consultations and Capacity Building				
Number of workshops and/or knowledge sharing successfully implemented (Number)		0.00	2.00	5.00

Monitoring & Evaluation Plan: PDO Indicators

Indicator Name	Definition/Description	Frequency	Datasource	Methodology for Data Collection	Responsibility for Data Collection
Updated RE strategies and/or regional integration plans adopted by countries	Adoption of updated RE strategies and regional integration plans by the government authorities of countries participating in the MPA program. Updated RE strategies and regional integration plans may include official government	Annually.	ACE.	ACE to report as part of regular reports on the implementation of activities.	ACE.

	records, policy documents, or strategic plan publications such as (but not limited to): national RE action plans, regional energy integration frameworks, climate change mitigation strategies, green growth strategies, energy sector reform policies, investment plans for RE, technology-specific deployment plans, or energy access expansion plans.				

Monitoring & Evaluation Plan: Intermediate Results Indicators

Indicator Name	Definition/Description	Frequency	Datasource	Methodology for Data Collection	Responsibility for Data Collection
Centralized database developed	The centralized database should include GIS data on renewable potential, energy projects, and environmental and social data including employment data. It will serve as a platform for knowledge sharing and collaboration.	Annually.	ACE.	ACE to report as part of regular reports on the implementation of activities.	ACE.
Inclusion of gender-disaggregated data on employment data as part of the centralized database	The centralized database should include GIS data on renewable potential, energy	Annually.	ACE.	ACE to report as part of regular reports on the implementation of	ACE.

	projects, and environmental and social data. The centralized database should include gender-disaggregated data on employment data.			activities.	
Pre-feasibility studies conducted	Pre-feasibility studies will focus on transmission and/or interconnection projects identified in the ASEAN power grid initiative. Studies will assess the technical, economic, and/or environmental aspects to assess the viability of such projects and provide recommendations for their implementation.	Annually.	ACE.	ACE to report as part of regular reports on the implementation of activities.	ACE.
Number of workshops and/or knowledge sharing successfully implemented	Number of events successfully implemented. "Successfully implemented" means that the event in question was conducted as planned and met its stated objectives. Events may include (but are not limited to): workshops, seminars, conferences, trainings, roundtables, or other capacity-building or knowledge-sharing events.	Annually.	ACE.	ACE to report as part of regular reports on the implementation of activities.	ACE.

ANNEX 1: Clean Energy and Power Trade Development in Southeast Asia Project (P181555)

COUNTRY: East Asia and Pacific
Clean Energy and Power Trade Development in Southeast Asia Project (P181555)

1. Summary description of activities. The objective of the proposed TA project (PDO) is *to help accelerate renewable energy scale up in the ASEAN countries*, *including through regional power trade*. The project will include the following components:

a. ***Regional renewable energy policy support and climate financing.*** Activities will include:

i. **Knowledge sharing and creation of centralized database:** Creating a centralized database and facilitating knowledge sharing among all stakeholders. The activity would involve collecting and disseminating GIS data on renewable potential, energy projects, environmental and social data including disaggregated gender-based employment data. The database(s) would serve as a platform for knowledge sharing and collaboration. It could also form the basis of discussions for members countries, investors, and international financial institutions alike looking to develop RE investment strategy and planning.

ii. **Market research and engagement with RE developers in ASEAN:** Conducting market research and engaging with RE developers to assess their interest and capacity to invest in the region. This would help identify potential investors, design effective procurement strategies, and promote private sector participation in renewables. Aside from market studies (regional and national), this would also involve organizing workshops, conferences, and matchmaking events to connect developers with potential project opportunities. The data will also inform the region-wide procurement strategy that would benefit member states looking to facilitate RE investments in their own countries.

iii. **Accessing climate finance:** Technical support (including financial, technical, and legal) to access carbon markets and climate finance mechanisms to support RE projects. It involves providing guidance on project eligibility, carbon credit generation, and registration, and accessing financial resources (for example, through review of fundraising applications). Climate Finance would also include Green/Sustainability-linked Financing Principle based finance and the requirement for capacity/institutional building at the country, sector, and institutional level. Another mechanism to be explored will be to set up a standardized process to issue Renewable Energy Certificates (RECs) that will facilitate not only financing but also clean energy trading for which the demand is high in the region. The activity is expected to involve workshops and conferences, to garner consensus at regional level on the standards and guidelines.

b. ***Regional power trade.*** Activities will include:

i. **Platform to facilitate regional power system planning:** Under the ASEAN Power Grid (APG) project, an interconnection study has been commissioned to be completed before the APG's Memorandum of Understanding (MoU) expiration in 2025. In addition to this region-wide initiative, the proposed TA project would provide additional support to: (i) reinforce technical capacity building, (ii) collect and aggregate data on system investments, and (iii) identify opportunities for optimization of system planning. The TA would support the creation of a platform to help countries and regional institutions identify critical cross-border interconnection projects and put in place guidelines, processes, and modalities to speed up the development of regional interconnectors, markets, and trading arrangements that are lacking in the region. In addition, the study will outline the market data to identify supply/demand trends and opportunities for both sellers and

buyers. The aim of such a platform would be to facilitate cross-border trade and cooperation in the RE sector through data sharing on investments that may be potentially contentious due to diversity of stakeholders and require regional forums of ministerial bodies, regulators, system operators, generators, investors, and civil societies to discuss significant trade-offs and build trust that is critical to progress. Such a platform would also enable a larger pool of sellers and buyers, enabling the expansion of liquidity and opportunities for investors in RE projects.

ii. **Pre-feasibility studies to enable regional power trade:** The activity will support three or more pre-feasibility studies of transmission/interconnection projects identified in the ASEAN power grid initiative. Studies will assess the technical, economic, and environmental aspects to assess the viability of such projects and provide recommendations for their implementation.

c. ***Knowledge sharing, consultations, and capacity building.*** Activities will include:

i. **Consultations:** Holding consultations with ASEAN member states and their national agencies/utilities to reach consensus on policy direction is a crucial part of promoting RE and regional power trade. ACE would be expected to fully utilize their convening power and coordination capacity to provide a venue for discussion among interested parties. In addition to ASEAN member states, ACE may extend invitations to the workshops, conferences, and consultations to other countries in the EAP region. The topics for consultation would be decided in discussion with World Bank teams who will also provide inputs and support to the process. Consultations with the ASEAN Secretariat are also expected to ensure continuity and synchronization with the ongoing dialogue in the region.

ii. **Reinforcing capacity in the development of RE market:** Capacity building would be a critical part of the sustainable solution for decarbonization and development of RE markets. Building on its existing analytical work and dialog with member states, ACE would identify capacity gaps and structure a capacity-building program for interested governments, agencies, and utilities.

iii. **Internships and secondment opportunities:** Learning experience may be provided to member states' ministries, regulators, and utility staff through designing and supporting implementation of internships and secondments (including, among others, travel costs and stipends) to other member states and beyond. This would include specific support for internship programs for female technical and managerial staff of energy sector utilities, companies, and/or institutions in participating countries. Candidates will be selected on a competitive basis and based on internship objectives and learning plans to be submitted to ACE.

iv. **Capacity building and training:** Capacity-building activities would include institutional capacity strengthening of ACE through implementation support provided on project management, financial management (including audits) and procurement, and environment and social risk management, monitoring, and reporting. The organization of such activities would be conducted in coordination with the World Bank team and in coordination with the ASEAN Secretariat.

2. Promotion of gender equality in the energy sector. Activities will be integrated within the components detailed above, and include: (i) gender-disaggregated data on employment data as part of the centralized database; (ii) technical support to networks promoting women in the energy sector's workforce (such as the WePower network) to set up regional chapters to encourage energy sector utilities, companies, and institutions among participating countries to take concrete actions to advance opportunities for women professionals; and (iii) support for the design of an internship programs for female technical and managerial staff of energy clients at energy companies of participating countries.

3. The detailed project components, activities and cost estimate are provided below:

Table A1.1: Activities and costs under Clean Energy and Power Trade Development in Southeast Asia Project

Items	Budget
REGIONAL RENEWABLE ENERGY POLICY SUPPORT AND CLIMATE FINANCING	**US$1,500,000**
Central Database (RE potential, ESF, Gender, etc.)	US$500,000
Market Research and engagement with RE developers	US$500,000
Climate Financing including RECs	US$500,000
REGIONAL POWER TRADE	**US$1,700,000**
Platform for System Planning and Data Sharing	US$500,000
Pre-Feasibility Study ($400,000 per study, for three studies)	US$1,200,000
KNOWLEDGE SHARING, CONSULTATIONS AND CAPACITY BUILDING	**US$1,800,000**
Conferences/Consultations/Knowledge Sharing	US$250,000
Capacity Building/Training/Workshops	US$150,000
Learning Opportunities - Internships/Secondments	US$150,000
Social Specialist	US$200,000
Environmental Specialist	US$200,000
Financial Management	US$100,000
Procurement Specialist (2 years full time / 3 years part-time)	US$100,000
SESA	US$100,000
Audit Fee	US$50,000
Operating Cost (incl. recurrent staff cost)	US$500,000
TOTAL	**US$5,000,000**

4. Results indicators. Indicators to monitor the progress of the proposed activities are:

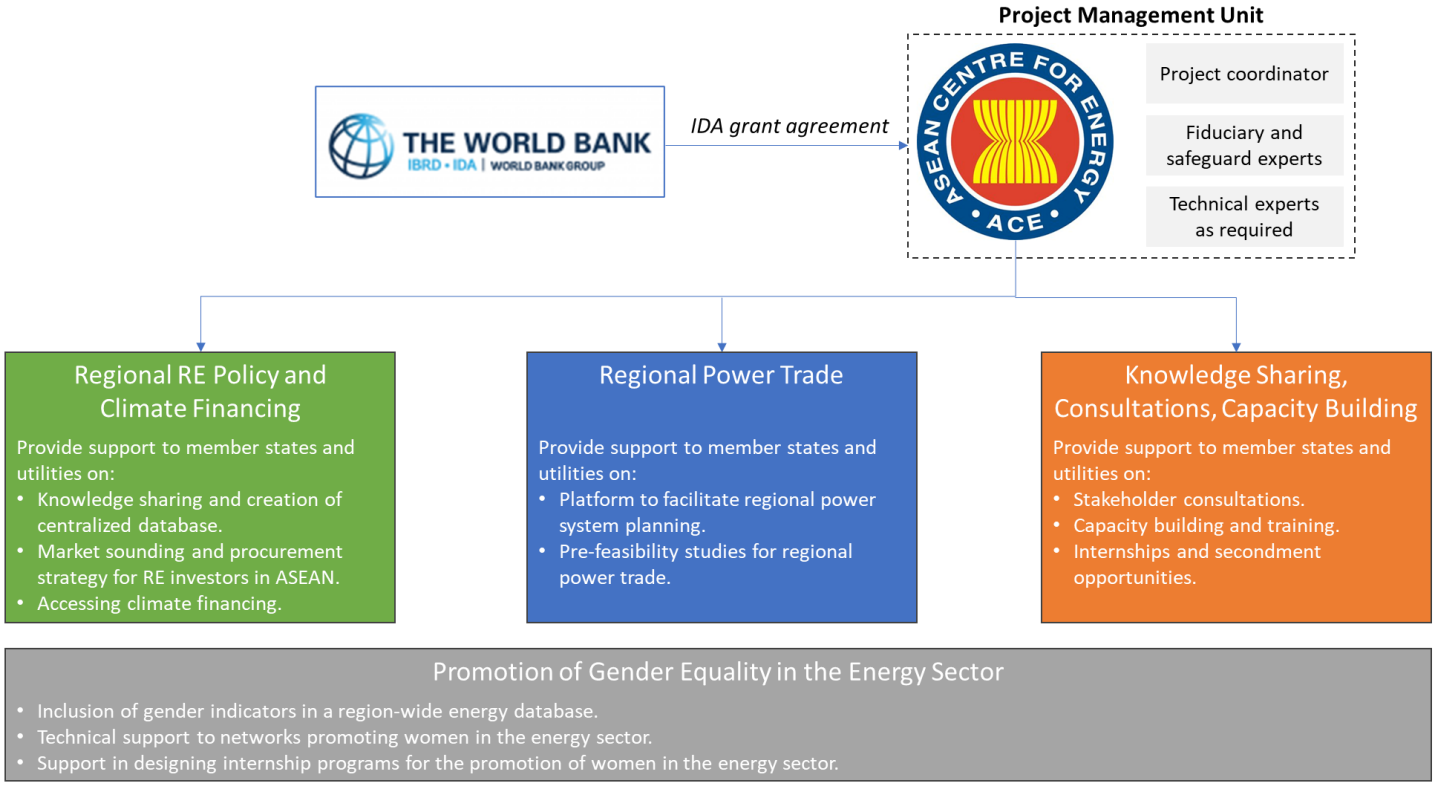
Table A1.2: Proposed indicators for Clean Energy and Power Trade Development in Southeast Asia Project

Indicator	Unit	End target
PDO indicator		
Updated RE strategies and/or regional integration plans adopted by countries	Number	2
Intermediate indicators		
Centralized database developed	Yes/No	Yes
Inclusion of gender-disaggregated data on employment data as part of the centralized database	Yes/ No	Yes
Pre-feasibility studies conducted	Number	3
Number of workshops and/or knowledge sharing successfully implemented	Number	5

5. Implementation arrangements. ACE will sign a Financing Agreement with the World Bank as the IA for the IDA regional grant to be provided through the MPA initiative of the World Bank (see Figure A1.1 below). ACE will set up a Project Management Unit (PMU) to be responsible for the day-to-day activities of the program as per guidelines and requirements as outlined in the Financing Agreement. ACE PMU would be responsible for compliance with all relevant World Bank policies and guidelines for procurement, FM, and environmental and social safeguards and will provide regular reports on the implementation of activities. ACE PMU will also be coordinating with various organizations, internally and externally, for implementation and delivery of the agreed program. ACE does not have safeguard

specialists as they do not have any investment programs but have agreed to complement the safeguard and other capacity gaps through procurement of external expertise. To support such an undertaking, ACE will appoint a Project Coordinator who will be supported by a team of experts recruited for procurement, FM, environmental and social safeguards, and other expertise as required. A POM, including definition of eligible expenditures, reporting requirements and FM arrangements will be developed and should be agreed upon with the World Bank. The POM will be adopted by ACE within 90 days of project effectiveness. The project is expected to be implemented over a five-year period and the closing date is June 30, 2029.

Figure A1.1: Implementation arrangements for the Clean Energy and Power Trade Development in Southeast Asia Project



6. The existing ACE FM arrangements meet the World Bank requirements and provide reasonable assurance that the project financing will be used for their intended purposes. The proposed project FM arrangements and mitigation measures are as follows: (i) the IDA grant will be accounted for in ACE entity's accounting system and included in the entity's financial report; (i) project budgeting, payment process, accounting records, the financial reporting, and external audit arrangements, including the project audit, will be handled under the ACE Administration and Finance Division following the ACE FM manual, and (iii) the project funds in the designated account (DA) should only be used for eligible expenditures under the IDA grant as per Annual Work Plan and budget approved by the Bank every year, including the interest income. The unaudited IFR will be submitted to the World Bank within 45 days after the end of the quarterly period of the calendar year. The format of the IFR will be agreed with the World Bank. ACE will hire an FM consultant to undertake the project FM activities and ensure timely submission the project IFRs and audit report. Training on World Bank's FM and disbursement arrangements will be provided by the World Bank.

7. Designated account. A segregated DA denominated in US dollars will be opened by ACE in a commercial bank acceptable to the World Bank. The recommended ceiling for the ACE DA account is variable. The advance(s) will be made

based on six-month projected expenditures. Advances will be deposited to this DA and will solely be used to finance project eligible expenditures. The eligible expenditures include (i) technical studies and other consulting services, (ii) training, workshops, publications-related expenditures, (iii) recurrent technical staff costs, (iv) travel stipends, and (v) incremental operating costs. The disbursement will be made to the eligible expenditures following agreed upon World Bank requirements. Funds from the DA could be further transferred to a local currency account (Indonesian rupiahs) to be held by ACE for local currency related payments.

8. Procurement arrangements and mitigation measures: Consistent with the implementation arrangements, initial procurement capacity and risk assessments have been carried out for ACE by the World Bank's procurement specialist in accordance with the World Bank's Procurement Risk Assessment and Management System (PRAMS). Key risks identified and proposed mitigation measures are as follows:

a. ***ACE is engaging with the Bank for the first time and has no experience implementing a Bank-funded project using the Bank's Procurement Regulations.*** The ACE Administration and Finance Division is responsible for the procurement function. The Division is headed by the Administration and Finance Manager who reports to the Executive Director. The Executive Director is the approving authority for all the procurement processes and contracts. There are three classifications of funds: Endowment Fund, General Fund, and Project Fund. The Project Fund has financing provided for a specific project by development partners and international organizations. The Bank's funds will be allocated to the class of Project Fund. ACE has experience working with USAID, the International Renewable Energy Agency (IRENA), Energy Foundation China, China Renewable Energy Engineering Institute, Japan Energy Efficiency Partnership, Japan Coal Energy Center, China Cooperation Fund, German Energy Program, Korea Energy Economics Institute, Institute of Energy Economics Japan, UNEP, National Science and Technology Development Agency, International Energy Agency, Japan Smart Community Alliance, Korea Gas Safety, Japan Oil, Gas and Metals National Corporation.

b. ***ACE will have to arrange a designated staff member for the Procurement process and contract management.*** The staff of the Administration and Finance Division handle these functions. The staff involved in procurement do not have specific procurement training and experience on the Bank's procurement regulations and procedures. As per the Audit Report 2022, ACE has contracted activities that are mostly below US$100,000. There is no experience in handling medium- to large-value procurement activities and contracts.

c. ***ACE prepares an annual budget.*** The budget covers the calendar year from January to December. The Executive Director prepares and submits the budget proposal to the ACE Governing Council for evaluation and approval. Procurement Planning needs to be improved, however, with planned timelines for the procurement cycle for each procurement activity with cost estimates and methods. There is a need to capture the data for the systematic monitoring and oversight of all planned activities' timelines, costs, and progress.

d. ***ACE has three tiers of procurement–the tendering process, the quotations, and open market purchases.*** Tendering is used for activities above US$30,000. Quotations are used for activity values between US$1,000-30,000. Open market purchases are used for activities below US$1,000. As per the ACE rules, there is no specific procurement method for hiring consulting services.

e. ***For procurement by tender, supplies, and services are initiated, forming a tender committee consisting of representatives from each division in ACE, which examines all tenders.*** The invitation to tender must include the title, specification, qualification criteria, and closing date. The tender committee secretariat is responsible for various tasks, including drawing specifications, advertising the tender request, and opening the tender box. The recommendation of the tender committee is submitted to the Executive Director for approval.

f. ***For procurement by quotation, at least three registered vendors to be requested to submit their quotations,***

and the process requires at least one week's notice. The quotations panel, consisting of senior staff from the Administration and Finance Division and the requesting division's manager, evaluates the vendors based on pricing, quality, reputation, capability, reliability, and adherence to the delivery schedule. The most suitable vendor is recommended to the Executive Director for approval and the Administration and Finance Division prepares a purchase order.

g. ***No standard procurement documents are available*** with clear details on the bidding process, evaluation process in terms of detailed assessment of key staff, methodology, work plan offered by the consultant, roles, responsibilities, and timelines of the bidder and employer/purchaser, the detailed contract conditions, and requirements for mitigating fraud and corruption.

h. ***ACE signs low-value contracts; therefore, there is no practice in place to prepare a contract management plan with KPIs for monitoring the contracts and payment process.*** No plan or data is available to monitor all the ongoing activities to identify the critical path. Due to the unavailability of a contract management plan, there is no data available on the regular monitoring and progress updates of ongoing contracts based on standard KPIs. There is also no specific and established complaint management mechanism for handling procurement-specific complaints. The data for monitoring the complaint process concerning the number of complaints, status, issues, and timelines is unavailable.

i. ***There is an established mechanism for asset management with all additions to disposals of fixed assets.*** Separate records are maintained for fixed assets acquired by donation.

j. ***The procurement records are maintained in a separate file with respect to each activity.*** The record and information are easily accessible for review. An electronic backup is also maintained for all the procurement records to avoid loss and damage.

9. Procurement risk. A summary of the capacity assessments of the ACE indicates that the institution generally has no experience using the Bank's Procurement Regulations. The summary of the overall assessment indicated the following risks: (i) lack of capacity; (ii) due to lack of understanding, poor quality of procurement documentation with delays in the development of technical requirements and delays in the procurement process; and (iii) high workload on the staff as the ACE unit responsible for Procurement handling is responsible for multiple functions. Proposed mitigations include: (i) recruitment of external consultants and training of staff; (ii) capacity building with detailed guidance in POM; and (iii) adherence to the Procurement Regulations. After implementing the mitigations, the overall procurement residual risk rating is *Substantial*. Assessment will be continuous throughout the project cycle and the ratings will reflect the periodic assessment outcomes. The Bank will provide continuous support, including procurement training and clinics, to IAs to ensure effective and efficient procurement implementation.

10. Procurement oversight by the Bank. Two semi-annual missions are envisaged for procurement implementation support for the project with PRAMS assessments. In addition to the prior review supervision that the Bank will carry out, the procurement capacity assessment has recommended one supervision mission each year to visit the field to carry out a post-review of procurement actions and technical review. The procurement post-reviews carried out by the Bank should cover at least 10 percent of contracts subject to post-review, as the risk rating is *Substantial* at project preparation. The risk rating is dynamic and will be revised accordingly during project execution. A detailed procurement report should be included in the Project Implementation Report and shared with the Bank quarterly and be updated at least one week before the implementation support mission starts.

Disbursement Arrangements, Auditing, and Documentation requirements

11. The audit reports and management letters should be submitted to the Bank within six (6) months after the

end of the fiscal year and should be made publicly available by the recipient in a manner acceptable to the World Bank**.** The project audits will be conducted by private audit firm(s) acceptable to the Bank. The project audit terms of reference will be agreed with the Bank. The audits should be done in accordance with International Standards on Auditing. The audit reports should also include a management letter documenting any internal control or accountability issues and contain an opinion that the expenditure classified as recurrent technical staff costs are in compliance with the Financing Agreement. The audit reports will be publicly disclosed by the Bank, in accordance with the Bank Policy on Access to Information.

12. Disbursement arrangements: the report-based method of disbursement will be used. The three disbursement methods will be (i) advance, (ii) direct payment, and (iii) reimbursement. Project funds will be disbursed to the project's designated account to finance activities and eligible expenditures. The reporting of use of the DA funds will be based on the quarterly ACE IFRs, which should be submitted to the World Bank no later than 45 days after the end of each quarter/semester. Applications for an advance to a DA and subsequent replenishments will be made through the submission of withdrawal applications, along with the details on the use of funds previously advanced, based on statement of expenditure aligned with the category of expenditure. Details related to disbursements will be included in the Disbursement and Financial Information Letter for the project.

13. Documentation requirements. All documentation for the expenditures as reported for disbursements would be retained by ACE and shall be made available to the auditors for the annual audits and to the World Bank and its representative, if requested. Details of type of documentation to be retained by ACE will be provided in the POM. ACE will be responsible for reconciling the DA and preparing separate applications for the withdrawal of reimbursements and advances. The proceeds of the IDA grant that ACE will receive will be disbursed against eligible expenditures (taxes inclusive).

ANNEX 2: Papua New Guinea: National Energy Access Transformation Project

COUNTRY: Papua New Guinea
National Energy Access Transformation Project (P173194)

DATASHEET

BASIC INFORMATION

Project Beneficiary(ies)	Operation Name		
Papua New Guinea	National Energy Access Transformation Project		
Operation ID	Financing Instrument	Environmental and Social Risk Classification	
P173194	Investment Project Financing (IPF)	Substantial	

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
24-Sep-2024	30-Dec-2030	31-May-2034
Bank/IFC Collaboration	Joint Level	
Yes	Complementary or Interdependent project requiring active coordination	

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

Proposed Development Objective(s)

To increase access to renewable energy and enhance the reliability of the electric supply.

Components

Component Name	Cost (US$)
Component 1: Rehabilitation, reliability enhancement of PPL infrastructure, and on-grid electrification	129,200,000.00
Component 2: Renewable energy micro-grids and rural energy market development	40,000,000.00
Component 3: Energy sector institutional development	16,000,000.00
Component 4: Project management	19,000,000.00

Organizations

Borrower:	Independent State of Papua New Guinea
Implementing Agency:	National Energy Authority, PNG Power Limited

MPA FINANCING DETAILS (US$, Millions)

MPA 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)?	Yes

SUMMARY

Total Operation Cost	**204.20**
Total Financing	**204.20**
of which IBRD/IDA	**200.00**
Financing Gap	**0.00**

DETAILS

World Bank Group Financing

International Development Association (IDA)	200.0
of which IDA Recommitted	26.20
IDA Credit	167.60
IDA Shorter Maturity Loan (SML)	32.40

Non-World Bank Group Financing

Trust Funds	4.20
Global Partnership on Output-based Aid	4.20

IDA Resources (US$, Millions)

	Credit Amount	Grant Amount	SML Amount	Guarantee Amount	Total Amount
National Performance-Based Allocations (PBA)	167.60	0.00	32.40	0.00	200.00
Total	**167.60**	**0.00**	**32.40**	**0.00**	**200.00**

Expected Disbursements (US$, Millions)

WB Fiscal Year	2025	2026	2027	2028	2029	2030	2031
Annual	5.00	25.00	30.00	40.00	40.00	40.00	20.00
Cumulative	5.00	30.00	60.00	100.00	140.00	180.00	200.00

PRACTICE AREA(S)

Practice Area (Lead)	Contributing Practice Areas
Energy & Extractives	

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	Substantial
2. Macroeconomic	Substantial
3. Sector Strategies and Policies	Substantial
4. Technical Design of Project or Program	Substantial
5. Institutional Capacity for Implementation and Sustainability	Substantial
6. Fiduciary Financial Management Risk rating from Specialist: Substantial as of 13-Sep-2023 Procurement Risk rating from Specialist: Substantial as of 12-Dec-2023	Substantial
7. Environment and Social Environment Risk rating from Specialist: Substantial as of 08-Feb-2024 Social Risk rating from Specialist: Substantial as of 08-Feb-2024	Substantial
8. Stakeholders	Substantial
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	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
FA Section I.A.1. of Schedule 2. The Recipient shall, not later than six (6) months after the Effective Date, or such other date as may be agreed with the Association in writing, establish and thereafter maintain, throughout the Project implementation period, a Project Steering Committee, with terms of reference, composition, and resources satisfactory to the Association, to be responsible for, inter alia, providing strategic and governance oversight of the Project, overseeing overall performance of the Project and facilitating policy discussion and coordination between agencies, all as set forth in the Project Implementation Manual ("PIM").
FA Section I.A.2. of Schedule 2. The Recipient shall cause NEA, not later than three (3) months after the Effective Date, or such other date as may be agreed with the Association in writing, to establish and thereafter maintain, throughout

the Project implementation period, a NEA Project Team and Owner's Engineer, with terms of reference, composition and resources satisfactory to the Association, which shall be responsible for implementing NEA's Respective Part of the Project; all as set forth in the PIM.
FA Section I.A.3. of Schedule 2. Without limitation to the generality of the foregoing, the Recipient shall cause NEA to, not later than three (3) months after the Effective Date (or such other date as may be agreed with the Association in writing), at a minimum, recruit or appoint as a NEA Project Team: (a) a Project manager; (b) a procurement specialist; (c) an environmental specialist; (d) a social specialist; and (d) a financial management specialist with accounting skills; each with terms of reference, qualifications and experience satisfactory to the Association, all as set forth in the PIM.
FA Section I.A.4. of Schedule 2. The Recipient shall cause NEA to, not later than three (3) months after the Effective Date (or such other date as may be agreed with the Association in writing), establish financial management readiness capacity at the PT and OE, including staffing a financial management function, accounting, and reporting systems, all as set forth in the PIM.
FA Section I.A.5.of Schedule 2. The Recipient shall cause PPL to: (a) not later than three (3) months after the Effective Date, or such other date as may be agreed with the Association in writing, employ and thereafter retain until completion of the Project, the services of the EPM, under terms of reference acceptable to the Association.
FA Section I.B.1 of Schedule 2. To facilitate the carrying out of the Project Implementing Entities' Respective Part of the Project, the Recipient shall make part of the proceeds of the Financing available to: (a) NEA in the form of a grant under a subsidiary agreement between the Recipient and NEA, under terms and conditions approved by the Association ("NEA Subsidiary Agreement"); and (b) PPL in the form of a grant under a subsidiary agreement between the Recipient and PPL, under terms and conditions approved by the Association ("PPL Subsidiary Agreement").
FA Section I.C.1 of Schedule 2. Not later than three (3) months after the Effective Date, or such other date as may be agreed with the Association in writing, the Recipient shall cause the Project Implementing Entities to: (a) Each prepare and furnish to the Association, for its review and no-objection, a Project implementation manual ("Project Implementation Manual" or "PIM") for its Respective Part of the Project.
FA Section I.F.1 of Schedule 2. The Recipient shall, and shall cause the Project Implementing Entities to, ensure that their Respective Part of the Project is carried out in accordance with: (a) the Environmental and Social Standards (except for Part 1.3 of the Project), in a manner acceptable to the Association; and (b) the Performance Standards with respect to Part 1.3 of the Project, in a manner acceptable to the Association.
FA Section I.F.2 of Schedule 2. Without limitation upon paragraph 1(a) above, the Recipient shall, and shall cause the Project Implementing Entities to, ensure that their Respective Part of the Project is implemented in accordance with the Environmental and Social Commitment Plan ("ESCP"), in a manner acceptable to the Association.
FA Section I.G.1 of Schedule 2. The Recipient shall cause each Project Implementing Entity to prepare and furnish to the Association, not later than three (3) months after the Effective Date and November 30 of each subsequent year during the implementation of the Project (or such other interval or date as the Association may agree), for the Association's review and no-objection, an Annual Work Plan and Budget, which shall, inter alia: (a) list all activities (including Incremental Operating Costs, Training and Workshops, and Sub-Grants proposed to be included in the Project for the following fiscal year of the Recipient; (b) provide a budget for their financing; and (c) describe the environmental and social measures taken or planned to be taken in accordance with the provisions of Section I.F of this Schedule 2.

Conditions

Type	Citation	Description	Financing Source
Disbursement	Withdrawal Conditions	Under Category (1) until the Project Implementing	Trust Funds

		Entity has: (i) adopted the Connection Cost Manual, acceptable to the Association; and (ii) hired an IVA to verify results under Part 1.2(b) of the Project.	
Disbursement	Withdrawal Conditions	Under Category (4) until PPL has adopted the VGF Grants Manual as part of its PIM, acceptable to the Association.	IBRD/IDA
Disbursement	Withdrawal Conditions	Under Category (5) until NEA has: (i) adopted the Grants Manual as part of its PIM acceptable to the Association; and (ii) hired a Grant Administrator and an IVA, to manage the activities under Part 2 of the Project.	IBRD/IDA
Effectiveness	Effectiveness of GA	This Grant Agreement shall not become effective until evidence satisfactory to the Bank has been furnished to the Bank that the conditions specified below have been satisfied: (a) The execution and delivery of this Agreement on behalf of the Recipient have been duly authorized or ratified by all necessary governmental action. (b) the Financing Agreement has been executed and delivered and all conditions precedent to its effectiveness or to the right of the Recipient to make withdrawals under it (other than the effectiveness of this	Trust Funds

		Agreement) have been fulfilled.	
Effectiveness	Effectiveness of FA	The Additional Condition of Effectiveness consists of the following, namely, that the GPRBA Grant Agreement has been executed and delivered and all conditions precedent to its effectiveness (other than the effectiveness of this Agreement) have been fulfilled.	IBRD/IDA

I. STRATEGIC CONTEXT

A. Country Context

1. Papua New Guinea (PNG), a lower-middle-income country with a per capita gross national income (GNI) of US$2,840 in 2024[18], ranks among the world's most culturally diverse and resource-rich nations. PNG ranks medium-low in human development, as most of the population lives in poverty and has limited access to public services. The extractive industries have been the main driver of growth, but the country has struggled to channel its considerable natural resources into delivering broad-based and sustained growth. Weaknesses in the business environment and access to, and the reliability of, infrastructure services deter investment and limit the positive economic spillovers from PNG's natural capital. The country's institutional and social fragility continues to pose a development challenge.

B. Sectoral and Institutional Context

2. Despite having rich untapped energy resources, including renewable energy (RE) resources, access to electricity in PNG is just over 20 percent overall and below 15 percent for on-grid electricity, being among the lowest access rates globally. The recent yearly per capita electricity consumption is 430 kWh (the world's average is 3,105 kWh). This and the pronounced urban-rural disparity hinder economic and social progress. Several challenges contribute to the low access to electricity, including inadequate least-cost planning and coordination of investment projects, which have led to the inefficient selection of projects which often results in high cost of electricity services and imbalances in supply and demand. Another major obstacle is the low affordability of households that spend approximately 20-24 percent of gross national income per capita on electricity services. Other impediments to ramping up access expansion are the lack of the necessary capability of key institutions and the limited private sector participation, especially in off-grid electrification.[19]

3. In the areas where grid electricity is available, power supply is unreliable, and customers frequently experience blackouts. In 2022, the System Average Interruption Frequency Index (SAIFI) for the two main grids in Port Moresby and Ramu[20] recorded 182 and 294 interruptions, respectively. Because of the unreliability of the power supply and high on-grid electricity cost, businesses[21] and households resort to expensive and inefficient self- and back-up diesel generators if they can afford it. Unreliable grid electricity supply is attributable to the generation capacity gap between the installed capacity and the operatable capacity, the low financial sustainability of PNG Power Ltd. (PPL)[22], and the exposure of obsolete and eroding infrastructure to natural disasters and extreme weather events. Non-payment by major customers, for example government agencies, has created a major cashflow challenge which has compelled PPL to reduce fuel purchases; limit power generation; delay payment to independent power producers (IPPs); delay and defer maintenance and upgrades; and thereby shed load on a rotational and increasingly unscheduled basis. The average retail tariff for residential customers in PNG is Kina (K) 0.8622 per kWh (US$0.2375 per kWh), which is on the lower end in the region, and has not been amended since 2013. Due to the continuous cashflow challenges, there is little incentive and financial resources for PPL to invest in expanding the grid and connecting low-income households, which are not seen as a profitable consumer segment.

[18] GNI per capita Atlas method (current US$), source: World Development Indicators, as of July 1, 2024.
[19] Barriers to private sector participation include: unclear regulations; unavailability of foreign currency; high transport costs to reach remote locations; low affordability; and difficulties in securing land, and installing, operating, maintaining, and protecting systems that are subject to vandalism in some areas.
[20] The three major grid systems in the country operated by PNG Power (PPL) are the Port Moresby System, the Ramu System, and the Gazelle System. In addition, some isolated urban areas are served by mini-grids that are owned and operated by PPL.
[21] This segment includes large customers for PPL such as mining companies.
[22] PNG Power Limited (PPL) is the state-owned utility company of PNG.

4. **Targets have been set and efforts to increase access to electricity have commenced, but much remains to be done to strengthen the institutions and implement priority investments.** The government of PNG (GoPNG) has set ambitious targets for electrification, aiming for 70 percent national electrification by 2030 through the National Electrification Roll-Out Plan (NEROP) and achieving carbon neutrality by 2050. The implementation strategy and investment plan for NEROP[23] was approved in May 2022, and serves as a long-term plan to anchor investments that are needed to reach the target. NEROP has identified the potential to expand PPL services in urban- and peri-urban areas and provide electricity in rural and remote communities with off-grid technologies, emphasizing least-cost planning for priority investments. Recognizing the vital role of the private sector in PNG's electrification efforts, the GoPNG is adopting measures to strengthen the enabling environment. Recently the National Energy Authority (NEA)[24] has developed the Off-grid Small Power Producers' Regulation that would facilitate public-private partnerships (PPPs) for isolated systems. Private sector capital is required to meet the investment needs of the NEROP investment program (estimated US$700 million)[25], that would connect approximately 1.7 million households by 2030. Thus, there is an urgent need for pilot projects to demonstrate the viability of PPP in micro-grid[26] projects.

5. **Further support is needed to help PPL improve its service delivery to complement the reform program implemented by Kumul Consolidated Holdings (KCH)[27] and PPL.** Existing power plant rehabilitation to alleviate the demand-supply imbalance is ongoing, but key gaps remain with transmission and distribution (T&D) infrastructure. The supply side will have enough capacity if ongoing rehabilitation works and new plants are undertaken on time, non-payment to IPPs is resolved, and IPP's power supply is guaranteed. Maintenance and rehabilitation of existing assets and modernization of the undermaintained network infrastructure need to continue, as supported under the ongoing World Bank-funded Energy Utility Performance and Reliability Improvement Project (EUPRIP, P167820). Moreover, the identification of least-cost investments would allow PNG to diversify its generation mix and reduce the dependency on imported fuel oil products and, with proper cost-control measures, render electricity more affordable. In addition, to support PPL's reform agenda, a roadmap to improve PPL's near- and medium-term operational and financial performance is being implemented by KCH. EUPRIP is integral to KCH's reform program as it supports PPL's operational and financial performance improvement, including restoring distribution assets and improving operational processes[28].

C. Relevance to Higher Level Objectives

6. **The proposed National Energy Access Transformation Project (the proposed project) will help the GoPNG's medium-term development priorities through nationwide electrification**. The GoPNG has established the Connect PNG Program to comprehensively build country-wide critical enabling infrastructure for socio-economic development. The Medium-Term Development Plan IV (MTDP IV) for 2023–2027 envisages providing electricity to 70 percent of households by 2030 through NEROP. The energy sector investment program of K 3,391 million (approximately US$910.95 million) is estimated to deliver these priorities in MTDP IV.

[23] NEROP recognizes the tiered level of electrification service where the minimum level of service such as by solar home systems (SHS) is Tier 1, while micro-grids will provide Tier 3 (or higher) level service, and grid service for existing PPL isolated grids and three main PPL grids will provide ideally 24 hours a day/ 7 days a week service.

[24] NEA is the key government institution with a new mandate to promote energy access.

[25] NEROP recommends that investments are implemented in a modular manner. According to the plan, achieving national electrification targets would entail about 61 percent of the incremental connections from on-grid, 37 percent from off-grid SHS stand-alone solar products, and 2 percent from micro-grids in selected communities. The PPL owned and operated mini-grids and the micro-grids for remote communities are two different segments.

[26] The proposed project uses a micro-grid that has an installed capacity from a few hundred kW to 1MW level, and a mini-grid with capacity up to 10MW level.

[27] KCH is the entity which holds in trust the Government's non-petroleum, non-mining assets, and shares of State-Owned Enterprises (SOEs) such as PPL.

[28] The project aims to improve the operational and financial performance of PPL by financing: (a) urgent rehabilitation of PPL's distribution infrastructure, (b) revenue protection program (smart meters) and management information systems, and (c) technical assistance and project management. EUPRIP provides a 'quick fix' and this effort needs to continue and be scaled up.

7. The proposed project is consistent with PNG's second Nationally Determined Contributions (NDC) in 2020. In the latest NDC of 2020 and MTDP IV, the country envisages that RE will account for 78 percent of installed capacity by 2030, as a priority action of NDC on climate change mitigation and adaptation. The NDC also envisages infrastructure to be built and rehabilitated in accordance with climate-resilient codes and standards, which is also emphasized in PNG's National Adaptation Plan (NAP). The proposed project aims to support RE-based electrification and incorporate resilient design while enhancing energy access.

8. The proposed project also supports one of the objectives of the World Bank Group's Country Partnership Framework (CPF) for FY2019–2024 (Report No. 128471-PG). Objective 2.4 of the CPF aims to improve planning and operational capacity for achieving the Government's electrification targets. The CPF indicates that the World Bank will support the Government's ambitious goal to provide electricity access to 70 percent of the population by 2030 and become fully carbon neutral by 2050.

II. PROJECT DESCRIPTION

A. Project Development Objective

9. The Project Development Objective (PDO) is to increase access to renewable energy and enhance the reliability of the electric supply.

10. The following indicators will measure progress toward achieving the PDO:

- Projected lifetime greenhouse gas (GHG) net emissions reduction from results achieved (metric tons of CO_2 equivalent)
- People provided with new or improved access to electricity (Number)
- Renewable energy capacity enabled (Megawatt)
- Reduction in system average interruption frequency index (SAIFI) in the Port Moresby and Ramu grids (Number)

B. Project Components

11. Component 1: Rehabilitation, reliability enhancement of PPL infrastructure, and on-grid electrification. This component will improve the capacity and reliability of electricity services and increase household (HH) connections for electrification and, through the PPP scheme, facilitate private sector involvement. This component has three subcomponents:

a. *Subcomponent 1.1:* Rehabilitation and modernization of distribution networks. This subcomponent includes rehabilitation and modernization of selected PPL's distribution network facilities, and the provision of mobile substations. It complements investments that are not covered by EUPRIP, as well as new investments, and it is expected to improve the efficiency and reliability of electricity supply and the RE integration jointly but separately. Duplication will be avoided by using the same implementing entity and one grid rehabilitation and modernization plan. The implementation arrangements will be detailed in PPL's Project Implementation Manual (PIM).

b. *Subcomponent 1.2*: Grid densification and expansion for household connections. This subcomponent aims to support (a) through Medium Voltage/Low Voltage (MV/LV) grid expansion and densification at selected locations; and (b) connections of Eligible Households (HHs)[29] through the provision of Eligible Connection Costs. Eligible HHs will be selected based on their ability to pay for internal wiring and/or the PPL connection cost. The electricity provided to HHs previously not connected to the grid is estimated to be approximately 51 percent RE-based. Global

[29] PPL's PIM will include procedures to manage personal data and use the principles as a good international industry practice.

Partnership for Results-Based Approaches (GPRBA) grant funds will be provided to PPL to cover eligible connection cost incurred by PPL for service drop and minimum supply kit (MSK)[30] for these HHs. Funds will be disbursed based on a results-based financing (RBF) scheme upon verification by an independent verification agent (IVA). The investments would allow to supply electricity to new customers.[31] The implementation arrangements and details of procedures and requirements for handling personal data will be detailed in PPL's PIM.

c. *Subcomponent 1.3*: Pilot Public Private Partnership in PPL mini-grids clean energy modernization. This subcomponent includes the provision of Viability Gap Financing (VGF) to a private company that will build, operate, own, and transfer (BOOT) mini-grid, through PPL. The subcomponent aims to pilot a new PPP mechanism to engage the private sector engagement in mini-grid development and improve the reliability of electricity supply in PNG. This pilot will be supported by providing VGF as a capital subsidy[32] to BOOT/Concession scheme to improve the scheme's financial viability. The VGF will be provided through PPL to introduce a clean energy generation option and modernize one obsolete small and isolated mini-grid[33]. This will incentivize private sector to invest in a RE mini-grid project with the expected amount of US$8 million as a private capital enabling (PCE) pilot project. During project implementation, in consultation with development partners and GoPNG, the site of the mini-grid will be selected from the five sites that the IFC transaction advisory has assessed[34]. Installing Solar Photo Voltaic (PV) and Battery Energy Storage System (BESS)[35] would transform the fully diesel mini-grid into a hybrid mini-grid[36] and would improve reliability of supply. This model would provide affordable electricity to households by maintaining the universal national tariff for residential customers, and a commercial users tariff equal to their willingness to pay. The share of electricity from solar PV and BESS injected in the system will be approximately 30 percent at the start of the operation, which will be the minimum requirement as specified in the auction (RE floor), in line with completed prefeasibility analyses and technical due diligence reports. The VGF will not finance the rehabilitation or replacement of diesel generators and will target non-diesel components of the Capital Expenditure (CAPEX)[37] plan. The private project company will be required to maintain a RE share by setting the 30 percent RE floor. The hybrid system design will be selected through an auction based on the bids of private companies and will maximize the use of the available land for solar PV and BESS. VGF grant arrangements will be detailed in PPL's PIM.

[30] MSK is a prefabricated standardized box that includes: (a) a main service breaker, (b) a pre-paid meter, (c) miniature breakers, (d) several outlets with switches, and (e) two built-in lights with switches. It is mounted on a wall inside a home through a service drop cable from the LV network. Thus, MKS is intended for a HH that does not have in-house wiring and cannot afford to install in-house wiring.

[31] Before the operation of HH connection infrastructure, HHs do not have access to grid electricity. Once this connection is operational, HHs can access highly low carbon electricity services. It is estimated that the additional share of renewable energy-based (hydro) electricity is approximately 51 percent of the electricity that will be delivered, and it is estimated based on the energy-mix in PPL's system that will be constant for the time being.

[32] It is considered that the project activity is completed when the mini-grid is commissioned, and customers can use electricity. Relevant ESMPs, O&M manuals, etc., are prepared, approved by relevant parties, and adopted by the concessionaire. Those will be implemented by the concessionaire during the operation and maintenance phase that begins after the commissioning of the mini-grid and will not be financed or implemented by the project. The same basis applies to the micro-grid in subcomponent 2.1.

[33] There are potential sites very far from the main grids, and the pilot site is not decided. Each mini-grid share in PPL's generation (2022) is mostly less than 1 percent.

[34] The International Finance Corporation (IFC) has been requested to be a transaction advisor to PPL and KCH for a PPP.

[35] Because securing wide and safe area of land for Solar PV is quite challenging in PNG, at the design stage, this PPP scheme considers publicly available land and existing PPL land both of which are limited, thus the Solar PV + BESS plant will not be able to supply baseload fully, and a diesel generation support is necessary to provide 24/7 reliable power supply. Before the operation of this new plant, a mini-grid relies on 100 percent fossil fuel generation. Once a new mini-grid system is operated, it is estimated that the new Solar PV + BESS plant will provide a minimum level of around 30 percent of electricity in a mini-grid system for the next five years. The BESS will store only solar power via DC connection at a site.

[36] Solar and stored solar energy are always dispatched first, and fossil fuel generation is dispatched next. In addition, the operation and maintenance manual will be prepared, and operation staff will be trained before commission to maintain sound plant operation.

[37] On average, the share of capex for PV and BESS is 38 percent, the distribution upgrade to accomplish reliable and climate-resilient system is 36 percent, the control room/office building is 10 percent, and the smart metering system is 16 percent.

12. Component 2: Renewable energy micro-grids and rural energy market development. This component aims to expand energy access in remote communities that are not served by PPL. It will include two subcomponents:

a. *Subcomponent 2.1:* Micro-grid systems. This subcomponent aims to provide investment grants through NEA to private service providers to install, operate, and maintain RE-based micro-grid systems in rural areas, typically targeting an area with a few hundred customers. A typical micro-grid[38] comprises a few hundred kW solar PV, BESS, LV and tentatively MV reticulation of up to several kilometers, and HH connections (LV service drop, and meter box). The grant implementation arrangements will be detailed in NEA's PIM.

b. *Subcomponent 2.2*: Solar-home systems (SHSs) and products. This subcomponent aims to increase the uptake of quality-verified SHSs and solar products in rural areas, through establishing a funding mechanism to provide catalytic grants and result-based financing (RBF) grants to eligible solar companies to extend their supply chains, develop markets, and scale-up the sales of Verasol-certified [39] off-grid solar energy kits. These grant implementation arrangements will be detailed in NEA's PIM.

13. Component 3: Energy sector institutional development. This component aims to strengthen PPL and NEA's capabilities to plan, survey, design, coordinate, and implement the NEROP to achieve the GoPNG's national energy access targets and to support the two entities in conducting strategic studies. It will consist of two subcomponents: Subcomponent 3.1. 'NEA institutional development' will provide technical assistance for key studies for project implementation, sector policy development, and related capacity building programs to be conducted by NEA.[40] The subcomponent will also address sector policy development support for RE scale-up. Subcomponent 3.2. 'PPL institutional development' will provide technical assistance for site identification and pre-feasibility studies for small[41] hydropower and other variable RE, and support for technical capacity development of PPL.[42] PNG is exploring result-based climate and carbon finance (RBC/CF) support opportunities with the Bank, which will include developing an institutional and regulatory framework for accessing and monetizing high integrity carbon emission reductions at the international carbon market. Based on further consultations to be conducted with the GoPNG, the proposed project may provide support under component 3 to assist NEA and PPL in assessing the readiness of PNG to set up the institutional and regulatory framework for carbon markets[43]. This will be discussed further during project implementation.

14. Component 4: Project management. This component aims to support the respective project management by NEA and PPL. Subcomponent 4.1. 'NEA project management' will help NEA to establish a Project Team (PT) that will be equipped with qualified staff to implement the activities under the responsibility of NEA. It will furthermore finance an Owner's Engineer (OE), a Grant Administrator, and an IVA, other consultants, and incremental operating expenses. Subcomponent 4.2. 'PPL project management' will provide technical assistance to PPL for project implementation and coordination, and monitoring and evaluation, including establishing an Employer's Project Manager (EPM) and PPL's Project Director (PD), a full-time internal PPL staff, to manage the Respective Part of the Project. It will furthermore finance

[38] Based on the NEROP report by GoPNG, a micro-grid considers Solar PV and BESS, and does not consider hydropower as energy source, thus under this subcomponent, hydro power plant will not be assessed and constructed.

[39] VeraSol certifies pico-solar products and solar home system kits to internationally recognized standards for product quality, durability, and truth-in-advertising.

[40] An indicative list of studies includes (a) preparation of pre-feasibility studies, preliminary design, and bidding documents for Component 2; (b) market study and preliminary design work for clean cookstove development; (c) off-grid solar products' technical standards enforcement and consumer protection and awareness raising; (d) business development support to participating companies through NEA; (e) household surveys; (f) updating the NEROP and mid-term review of the NEROP implementation arrangements; (g) cost-of-service and tariff rate design study; (h) renewable energy potential assessment and promotion policy; (i) women's employment promotion program; and (j) training.

[41] Expected capacity of hydropower is less than 10 MW, and the selection criteria will include that such a project does not have international waterways.

[42] An indicative list of studies includes studies for (a) E&S impact of solar PV plants in places where they are potentially available to reduce the reliance on the diesel generation and CO_2 emissions; (b) PPP and concession management capacity building; and (c) other priority studies and activities for PPL such as the Least Cost Power Development Plan (LCPDP), variable renewable energy integration, provincial and local government engagement program, new customer awareness program, and women's employment promotion program.

[43] This may support high-level capacity building for high-integrity carbon credits, monetization support, and benefit sharing in the energy sector to inform the government of high-level policy support through NEA.

an IVA, consultants and incremental operating expenses.

15. An overview of the project components and estimated costs is presented in Table A2.1. The project will include IDA Blend Credit, Shorter Maturity Loan (SML), and grant financing from the Global Partnership for Results-Based Approaches (GPRBA).

Table A2.1. Project Components and Cost

Project Component	**Amount** *(USD million)*[a]	**Proposed Financing** *(USD million)*		
		IDA Blend Credit	IDA SML	GPRBA
1. Rehabilitation, reliability enhancement of PPL infrastructure, and on-grid electrification	**129.2**	**92.6**	**32.4**	**4.2**
(1) Rehabilitation and modernization of distribution networks	72.0	39.6	32.4	0.0
(2) Grid densification and expansion for household connections	42.2	38.0	0.0	4.2
(3) Pilot Public Private Partnership in PPL mini-grids clean energy modernization	15.0	15.0	0.0	0.0
2. Renewable energy micro-grids and Rural energy market development	**40.0**	**40.0**	**0.0**	**0.0**
(1) Micro-grid systems	20.0	20.0	0.0	0.0
(2) Solar Home Systems (SHS) and Products	20.0	20.0	0.0	0.0
3. Energy Sector Institutional Development	**16.0**	**16.0**	**0.0**	**0.0**
(1) NEA institutional development	4.0	4.0	0.0	0.0
(2) PPL institutional development	12.0	12.0	0.0	0.0
4. Project Management	**19.0**	**19.0**	0.0	**0.0**
(1) NEA project management	6.0	6.0	0.0	0.0
(2) PPL project management	13.0	13.0	0.0	0.0
Total	**204.2**	**167.6**	**32.4**	**4.2**

Note: a. Components 1 and 2 are modular and therefore suitable for a phased approach to scale up.

C. Project Beneficiaries

16. **The primary project beneficiaries are households, small, and medium enterprises, and communities in PNG** who either did not have access to modern energy services in rural areas, or only had unreliable ones in urban or peri-urban areas served by PPL. Electrification in rural areas is expected to contribute to better public service delivery such as in health and education. Commercial enterprises experiencing unreliable supply in PPL's obsolete and eroding mini-grids will benefit from higher quality of service delivery by a private company. In addition, the proposed project will benefit private companies offering off-grid RE solutions through the creation of new market opportunities and the provision of support mechanisms for expansion of their businesses to new remote areas where it would not be financially viable without the subsidy. NEA and PPL are project beneficiaries as well, given that the project will help strengthen their institutional capabilities. The proposed project will enable about 194,000 people to be connected to the grid in urban areas and mini-grid areas of PPL, and they will receive Tier-3 access according to the Multi-Tier Framework (MTF)[44]. Access expansion will increase the power supply of PPL and enable gradual increase of consumption by customers. In rural areas, approximately 232,000 people (new off grid customers) will obtain access to electricity through micro-grids and SHSs. Micro-grid connections would allow all customers to gradually increase their power consumption.

[44] The MTF initiative redefines the way energy access is measured and acknowledges that electricity access is a spectrum of service levels experienced by households, businesses, and institutions.

D. Rationale for Bank Involvement and Role of Partners

17. Development partners are actively supporting the GoPNG with its electrification goals. The Governments of Australia, Japan, New Zealand, and the United States launched the PNG Electrification Partnership with the GoPNG in November 2018. The joint statement issued in 2018 acknowledges the need for large scale investments by both the public and private sectors in new generation capacity, transmission, and distribution lines to connect households, as well as continued efforts to improve institutional and regulatory frameworks to unlock private investment. The GoPNG has requested the World Bank to finance the proposed project to establish a platform for implementing the NEROP.

E. Lessons Learned

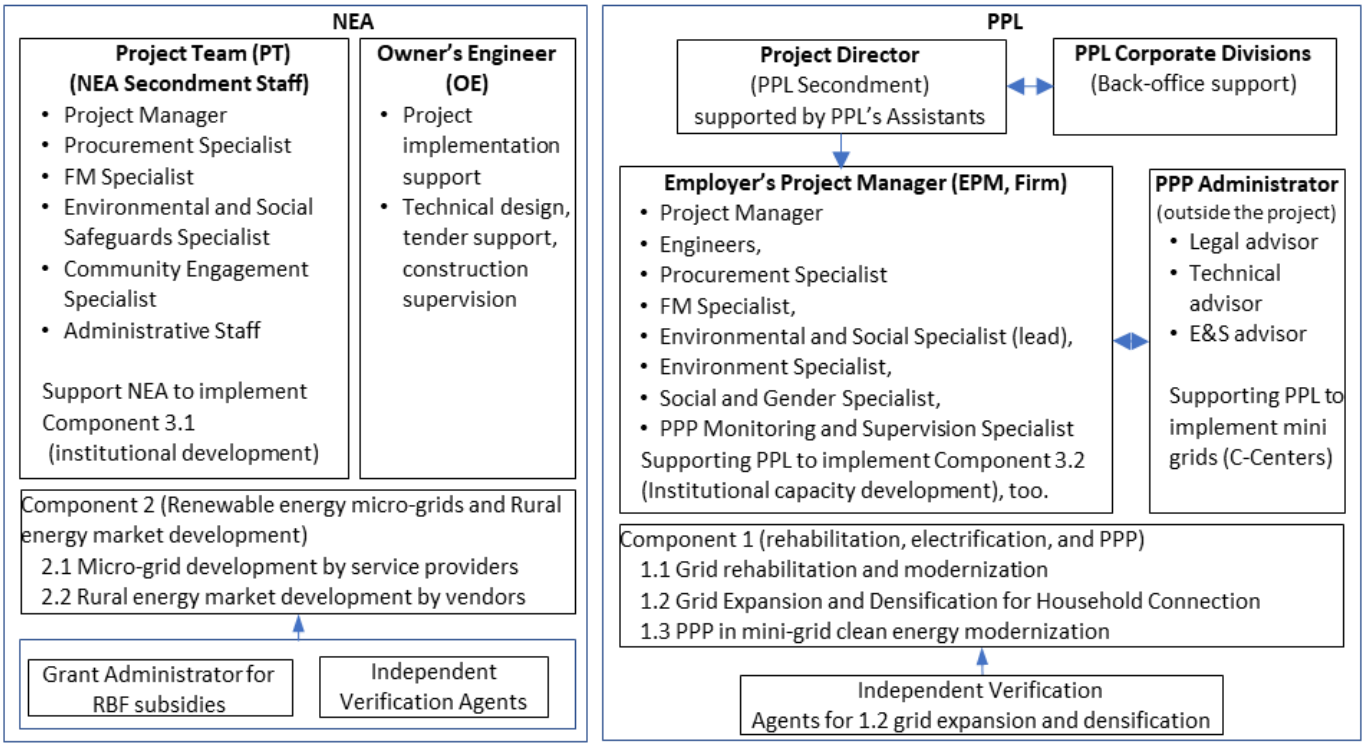
18. The proposed project draws on several lessons learned from many years of the World Bank's experience in supporting energy access initiatives around the world and from implementing projects in fragile and weak-capacity environments such as in PNG. Lessons that were considered in the project design include: (i) past evaluation identifies energy access as a major global challenge and recommends that the World Bank engages in countries with low electricity access as a global solution provider; (ii) expanding energy access requires comprehensive planning, integrating grid and off-grid solutions and bringing development partners together in a framework of 'one plan, one team, many partners'; (iii) combining public and private sector skills and resources involving grid, mini-grid, and home-based systems can be effective in accelerating energy access; (iv) the utility should be operationally and financially strong to absorb new connections and it requires a performance improvement strategy; and (v) intensive project implementation support in the form of an EPM increases the success of infrastructure projects in PNG.

III. IMPLEMENTATION ARRANGEMENTS

A. Institutional and Implementation Arrangements

19. The proposed project will be implemented by two entities: PPL and NEA. PPL will implement activities under Component 1, and Subcomponents 3.2 and 4.2. NEA will implement activities under Component 2, and Subcomponents 3.1 and 4.1. PPL project implementation will be enhanced by EPM under Project Director (PD). The PD will initially recruit individual consultants (technical, and environmental, social/gender) to prepare the terms of reference (ToR) for the EPM. The EPM will assist PPL in ensuring delivery of technical, fiduciary (procurement and Financial Management (FM)), Environmental and Social (E&S) and gender-related activities, monitoring and evaluation (M&E), and other aspects of project implementation, management, and technical assistance. EPM will also have a PPP Monitoring and Supervision (M&S) specialist who will monitor and supervise the PPL mini-grid PPP. The specialist will work with a PPP administrator (external to National Energy Access Transformation Project implementation arrangements), who will support PPL and collaborate with the EPM to manage the concession scheme. The proposed project will also support incremental operating expenses to implement project activities. HH connections under Subcomponent 1.2 will be verified by an IVA. After PPL completes the work, it will submit a report to IVA to claim payment. IVA will verify whether claimed customers are connected to the system, and costs are eligible. Based on this, PPL will submit the verified claim to the World Bank. More details will be provided in the Connection Cost Manual. For NEA, the project will be implemented by PT, OE, a Grant Administrator (GA), and an IVA. NEA's PT will comprise of internal staff. The OE will support the PT in updating electrification planning and providing technical support for micro-grids projects. The GA will manage fiduciary aspects of Subcomponent 2.1 and 2.2, both of which will provide capital grant support in accordance with various manuals (Grants Manuals for the Investment Grants, Catalytic Grants, and RBF Grants). An IVA will be recruited to support NEA as well, and to verify Subcomponent 2.2 results.

Figure A2.1. Project Implementation Arrangements



Grant Administrator processes subsidies for Components 2 and 3 in accordance with the Implementation Manual approved by WB. A separate window will be established for each component.

Independent Verification Agents check and verify the triggers for subsidy payments for Component 1.2, Component 2.1, and 2.2 in accordance with the Implementation Manual approved by WB.

20. Coordination in planning and implementation. NEA will work side by side with the OE and PPL with EPM, to coordinate the annual expansion planning that would help site selection to avoid overlapping each other's future plans in collaboration with national and provincial stakeholders. NEA and PPL will periodically update the NEROP plan and its geospatial analysis data supported under the project and consider inputs from the GoPNG and other stakeholders. The project will provide support to prepare the power master plan to inform subsequent investments priorities.

B. Results Monitoring and Evaluation Arrangements

21. NEA PT/OE and PPL EPM under PD will monitor and evaluate the progress of respective components of the project against the results indicators in the Results Framework, establish, and confirm baselines where required, and prepare progress reports that shall cover the period of one calendar semester and submit the report to the World Bank through the GoPNG. NEA and PPL will participate in the Mid-Term Review (MTR) to assess the status of project implementation and to this end, prepare and submit a report that integrates the results of M&E activities and elaborate on the achieved progress to the World Bank through GoPNG not later than forty-five (45) days prior to the MTR, so the GoPNG can submit a consolidated report to the Association not later than one month prior to the MTR. Not later than four (4) months after the closing date, NEA and PPL will prepare each completion report and submit to the World Bank through the GoPNG. NEA and PPL will also be responsible for regularly monitoring that the grievance redress mechanism (GRM) is functional, and reporting any grievances received and associated responses are actioned in a timely manner. This information will be also reported in the regular progress report.

C. Sustainability

22. GoPNG is committed to ensuring the sustainability of the NEROP with key national and sector development policies. NEA will be responsible for regulating and licensing micro-grid operators. Proper regulation is essential to attract private sector investments and facilitate RE. The institutional development component will address gaps that may arise in the regulatory and policy framework of NEA. To ensure the financial sustainability of PPL, it is crucial to incentivize the company to connect customers. PPL cannot recover the cost of connecting and serving households that consume a relatively small load under the current situation. Therefore, it is important to support PPL's corporate financial recovery and incentivize the extension of household connections. The World Bank will continue to support PPL's financial recovery, discussions with KCH on comprehensive PPL reform measures, and the cost-of-service and tariff study under the project. The GPRBA grant will further facilitate and incentivize the extension of household connections. To facilitate capacity building and knowledge transfer, experts will support NEA and PPL as part of the project management consultants (OE and EPM).

IV. PROJECT APPRAISAL SUMMARY

A. Technical, Economic and Financial Analysis

23. Technical analysis. While the project will add the incremental demand on PPL main grids, such demand will be met by primarily investments in RE. Component 1 will perform the distribution grids rehabilitation, system automation upgrade, grid expansion, and densification for HH by PPL, and the PPP scheme will install a few megawatt (MW) Solar PV with BESS for an isolated mini-grid to convert an obsolete mini-grid supplied by diesel into a new hybrid mini-grid. For Component 2, each new micro-grid will adopt a few hundred kW Solar PV with BESS by a private service provider, and private companies and vendors will sell qualified solar products such as Verasol-verified products. Components 1 and 2 will enforce the international standards and internationally recognized design and practices that are adopted by qualified contractors, original equipment manufacturers, and suppliers. EPM in PPL and OE in NEA will support implementation from the beginning, thus implementation will be technically standardized, sound, and replicable.

24. Climate Change and Climate Co-Benefits. PNG is vulnerable to climate and weather-related hazards that are exacerbated by climate change. Given that physical assets such as T&D, solar PV mini-grids are exposed to such hazards, the electricity network operation tends to be disrupted, and customers suffer from unreliable supply, frequent and long outages. The proposed project has been screened by using the Climate and Disaster Risk Screening Tool. Based on this tool, the project type is divided into distribution of electricity, and other RE, thus, screening has been done separately for these two segments. Types of hazards assessed include climate change hazards[45] and geophysical hazards[46]. The proposed project intends to lessen and mitigate the exposures and vulnerability to these hazards through proper site selection, adoption of widely acceptable resilient design standards and practices for both on-grid and micro-grid (off-grid Solar PV) investments and stand-alone systems. The impacts on the project's physical components and risks of climate hazards to the achievement of the project outcome and service delivery are assessed as low to moderate and are manageable.

25. Subcomponent 1.1 will rehabilitate existing equipment and provide SCADA and automation that would enable PPL to recover systems failure caused by disasters quickly. Furthermore, PPL will procure mobile substations as post-disaster recovery tools, that would allow to enhance power system resilience. In addition, Subcomponents 1.2, 1.3, and 2.1 will follow international standards and practice and will integrate changing environmental and natural condition

[45] Climate change hazards share is 65 percent of total.
[46] Geophysical hazards share is 35 percent of total, including earthquake (20 percent) and landslides (15 percent) (tsunami and volcanic eruption hazards are assessed at 0 percent).

affected by climate change into the design, and construction. In this way, physical assets and network system will be made more climate resilient than existing assets. Further climate risk reduction measures to be incorporated in both Components 1 and 2 include the following: (i) extreme temperature risks will be mitigated though tailored technical design of power equipment, line conductors, solar panels; (ii) flood risk will be reduced through high-rise foundations, and installation of water-tight marshal box for selected locations; (iii) strong winds risk will be reduced through the installation of steel and/or concrete poles, high-line tension, anchoring cables for increased strength, and a rigid steel frame support with deep concrete foundation for equipment and solar PV; and (iv) incorporating a contingency plan, purchasing of spare parts, materials, and deployment of mobile substations. Climate-specific technical knowledge and trainings will be carried out for both implementing entities and customers under both Components 1 and 2. Workshops will integrate climate resiliency, awareness raising programs, climate-informed site selection exercises, and on-the-job learning to EPM and OE. Support will be provided to NEA to develop policy and strategy for reducing energy sector specific climate vulnerability, in line with national priorities elaborated in the NAP.

26. GoPNG envisages that 78 percent of installed capacity will come from RE by 2030, and that the proposed project will contribute to that goal through modernization and expansion of the grid to deliver generated RE in selected locations. The grid rehabilitation and enhancement under Subcomponent 1.1 will achieve two goals: (i) it will improve the energy efficiency of targeted substations by about 35 percent; and (ii) it will enable the power grid to absorb higher levels of RE supply as compared to the average from the last five years. Under Subcomponent 1.2., electricity will be supplied to new customers; it is estimated that around 50 percent of this newly provided electricity will be generated from renewable and clean sources. Similarly, under the private sector-led PPP scheme, an isolated PPL mini-grid that currently relies on 100 percent diesel generation will be reduced with the installation of Solar PV with BESS on the limited land to convert to a hybrid mini-grid. This would improve the reliability of supply and reduce the self-diesel backup generation, thereby reducing GHG emissions under Subcomponent 1.3. Under Component 3, TA for enabling climate and carbon finance has the potential to contribute to RE scale up in PNG. These will enable the partnership to foster climate friendly and innovative technology to achieve energy sustainable goals and to improve and accelerate electrification demand by supporting RE-based on- and off-grids, SHS, and solar products. It is estimated that the proposed project will result in a net CO_2 emission reduction by approximately 0.44 $MtCO_2eq$ over the economic lifetime.

27. Paris alignment. The proposed project is aligned with the goals of the Paris Agreement on Climate Change on both mitigation and adaptation. All activities under the project support technical loss reduction in electricity distribution without dedicated transmission lines to fossil fuel power plants, installation of solar PV with BESS to mini-/micro-grids, and supply of solar energy kits, which are universally aligned under the category of electricity transmission and distribution. Furthermore, through the private sector-led investment in PPL mini-grid that currently relies on 100 percent diesel generation, the existing system will be converted into a hybrid system by installing solar PV with BESS. In the operation of the mini-grid, RE will be dispatched first, and any diesel generation that is required for reliability will be dispatched second. The final hybrid system design will be least cost with maximum feasible RE generation, and the most technically and economically viable out of all bids presented by private companies. The project will finance "non-diesel" components and the RE units will be well maintained to operate optimally. The design will consider proper technical conditions to minimize the impact of climate change and disaster. On adaptation, as mentioned above (paragraph 24), risks from climate hazards are low to moderate, and can be reduced to an acceptable and manageable level through risk reduction measures.

28. Economic analysis. The 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 (ERR) by comparing cases with and without the project. The main areas of benefits from the project investments are: (i) reduced unserved energy in the two main grids, (ii) improved energy services delivered to existing customers, (iii) provision of energy services to new customers, (iv) increased supply reliability, and (v) increased resiliency and decline in response time in the case of

an emergency. The economic costs include investment costs, and operation and maintenance (O&M) cost during the economic life of the assets.

29. Key assumptions are:

- Investment cost is US$204.2 million which will be spent over the period of 2025-2030.
- The SAIFI for Port Moresby decreases from 182 in 2023 to 152 in 2030; in Ramu from 294 in 2023 to 180 in 2030.
- Willingness to pay is approximately US$85.86 annually for households without access[47].
- Avoided cost of self-generation, US$0.44 per kWh and value of lost load of US$1.5 per kWh.
- Carbon values are priced following the Bank's Guidance Note on Shadow Price of Carbon in Economic Analysis, revised in 2023. The low-end values are adopted.
- Economic life is 30 years and social discount rate 9 percent.

30. The proposed project will reduce the technical losses by 4.8 GWh annually, reduce unserved energy by 15.7 GWh annually and avoid US$392 million cost for self-generation by households, commercial and public customers. It will contribute to avoiding carbon emission by 15,900 tons of CO_2 equivalent (tCO_2e) annually and reduce carbon emission over its lifecycle by approximately 0.44 $MtCO_2e$. The analysis shows that the project is economically viable and yields strong economic returns and GHG mitigation benefits. The project's ERR is 23.9 percent, well above the hurdle rate or social discount rate of nine percent, and the ENPV is approximately US$159 million. With environmental benefits, the project's ERR is 24.3 percent and ENPV US$165 million.

31. **Financial analysis.** A discounted cash flow analysis considered expenses (capital cost and O&M) and revenues that directly affect the financial cash flows and assumed that additional revenue will be generated from the electricity supplied to new customers, avoided technical losses, and reduced unserved energy. Other financial revenues could be generated from improved collection rate due to improved reliability of power supply to commercial customers who currently rely on backup generation. The analysis focuses on the PPL investments and financing for Subcomponent 1.1. and 1.2. that are assumed to be on-granted from the Department of Treasury (DoT). The result shows that the investments are not financially viable if IDA credit is on-lent at the same terms as it will result in a low Financial Rate of Return (FRR) of 2.7 percent, however, the project renders better returns if the IDA credit is on-granted and the FRR increases to 7 percent. Sensitivity analysis demonstrates that the results of the financial analysis are robust, and the project will be viable in the cases of: (a) overrun of investment cost by 15 percent; (b) increase of the annual operation cost by 40 percent; and (c) decrease of additional electricity sales by 10 percent. A project finance modeling and analysis for Subcomponent 1.3. was conducted separately as part of the IFC transaction advisory and adapted for VGF provided through PPL to the private operator. The analysis reveals that the project will yield an FRR of 15 percent based on targeted equity IRR of 23 percent, and a nominal post-tax WACC of 10.6 percent.

B. Fiduciary

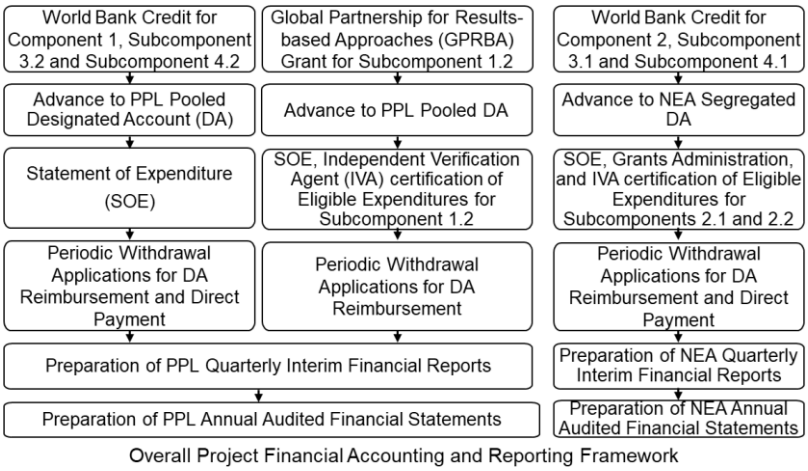
32. **Financial Management (FM).** The proposed project's FM arrangements meet the World Bank's requirements and provide reasonable assurance that the proceeds of the financing will be used for their intended purposes. The FM assessment[48] concludes that the proposed implementation arrangements meet the World Bank's policy requirements, subject to the implementation of mitigation measures to address the identified risks, including EPM and PT/OE readiness, to be a dated covenant and the grant administration arrangements to be a disbursement condition for the capital grant funding portion for Subcomponent 1.2, 1.3 and Component 2. Implementation arrangements include the establishment of an EPM at PPL and a PT/OE at NEA to be responsible for all project-related FM activities. Project activities will be ring-fenced, including stand-alone budgeting, funding, accounting, and reporting arrangements to be maintained by respective entities. Also, Component 2 activities will be managed by a Grant Administrator and an IVA. Two Designated Accounts

[47] Multi-tier Framework Assessment for PNG from 2023; K307 at 2023 exchange rate of 3.58 PGK/US$
[48] FM assessment was conducted in August 2023.

(DAs) will be established to fund activities to be implemented by PPL and NEA, with each entity accounting for allocated funding and reporting separately. Achieving FM readiness at respective institutions will include staffing FM functions, accounting and reporting systems, financial reporting and auditing arrangements, and project operations manuals acceptable to the World Bank. Achieving these requirements will be a dated covenant. World Bank approval of the grant manuals and the contracting of a Grant Administrator and IVA will be a disbursement condition for the capital grant funding portion for Component 2. Until the proposed arrangements are in place, the overall FM risk rating is assessed as Substantial and expected to be Moderate after the proposed actions are completed.

33. Financial reporting. Interim financial reports (IFRs) will be prepared and submitted quarterly by each implementing entity (IE) within forty-five (45) days after the end of each reporting period. The form of presentation and content will be developed and agreed upon with respective accounting and reporting entities. IEs will prepare each IFR and deliver it to the Bank. In addition, each IE will annually submit audited financial statements covering respective project activities. The financial statements will be prepared in accordance with acceptable accounting standards and will be audited by an independent auditor under acceptable auditing standards. The audited financial statements and copies of management letters will be submitted to the Bank within six months after the end of each reporting period. The audited financial statements will be published on respective IEs' websites and by the World Bank. The existing arrangements at PPL are acceptable, and NEA will be required to establish and maintain similar arrangements.

Figure A2.2. Funds Flow and Accountability Arrangements



Overall Project Financial Accounting and Reporting Framework

34. Disbursement arrangements. Respective IEs' DAs will receive and manage funds disbursed from the World Bank to finance activities and eligible expenditures. As the recipient, DoT will enter into subsidiary agreements with each IE. Arrangements for financial management of World Bank funding to respective DAs will be specified in the Disbursement and Financial Information Letter (DFIL). The proposed project may use either of four disbursement methods: (i) advances, (ii) direct payments, (iii) reimbursement, and (iv) special commitments. Disbursement will be against statements of expenditure, electronically submitted withdrawal applications, and supporting documentation for the incurred expenditures. The category of expenditure is summarized in Table A2.2.

Table A2.2. Disbursement Categories

Category	IDA Blend Credit		IDA SML		GPRBA Grant	Percentage of Expenditures to be Financed (inclusive of taxes)
	Amount of Credit Allocated (SDR million)	Amount of Credit Allocated (USD million)	Amount of the SML allocated (SDR million)	Amount of the SML allocated (USD million)	Amount of Grant Allocated (USD million)	
(1) Goods, works, non-consulting services, and consulting services, Training and Workshops, and Incremental Operating Costs for PPL under Parts 1 (except Part 1.2(b)), 3.2, and 4.2 of the project)	77.55	102.6	24.5	32.4	0.00	100%
(2) Goods, works, non-consulting services, and consulting services, Training and Workshops, and	7.60	10.00	0.00	0.00	0.00	100%

Category	IDA Blend Credit		IDA SML		GPRBA Grant	Percentage of Expenditures to be Financed (inclusive of taxes)
	Amount of Credit Allocated (SDR million)	Amount of Credit Allocated (USD million)	Amount of the SML allocated (SDR million)	Amount of the SML allocated (USD million)	Amount of Grant Allocated (USD million)	
Incremental Operating Costs for NEA under Parts 2, 3.1 and 4.1 of the project						
(3) Eligible Connection Cost under Part 1.2(b) of the project	0.00	0.00	0.00	0.00	4.20	100%
(4) VGF Grants under Part 1.3 of the project	11.35	15.00	0.00	0.00	0.00	100%
(5) Investment Grants, Catalytic Grants, and RBF Grants under Part 2 of the project	30.20	40.00	0.00	0.00	0.00	100%
Total Amount	**126.7**	**167.6**	**24.5**	**32.4**	**4.20**	

35. Disbursement and retroactive financing. The IDA Credit, IDA SML, and grant withdrawal conditions are summarized in the data sheet above. Retroactive financing from the IDA Credit for Eligible Expenditures under Categories (1) and (2) in an amount not exceeding SDR 25.3 million, and from the IDA SML for Eligible Expenditures under Category (1) may be available in an amount not exceeding SDR 4.9 million for payments made on or after July 1, 2024. Amounts under Category (3), (4), and (5), however, are subject to disbursement conditions and cannot be withdrawn unless and until: (i) PPL has adopted the Connection Cost Manual as part of its PIM, acceptable to the Association and hired an IVA to verify results under Part 1.2(b) of the project; (ii) PPL has adopted the VGF Grants Manual as part of its PIM, acceptable to the Association; and (iii) NEA has adopted the Grants Manual as part of its PIM acceptable to the Association and hired a Grant Administrator and an IVA, to manage the activities under Part 2 of the project. The Annual Work Plan and Budget will specify the source of the financing (IDA Blend Credit or SML) for the Eligible Expenditures under Category (1).

36. Procurement and risk assessment[49]. Procurement for the proposed project will be carried out in accordance with the World Bank Procurement Regulations for Investment Project Financing (IPF) Borrowers, dated September 2023 as well as the provisions stipulated in the Financing Agreement and project's Procurement Plan(s). The World Bank's Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants, referred to as the World Bank's Anti-Corruption Guidelines (latest update July 2016) will also apply. The World Bank's Systematic Tracking of Exchanges in Procurement (STEP) system will be used to prepare, clear, and update Procurement Plans and conduct all procurement transactions for the project. The proposed project will finance goods, non-consulting services, consulting services (firms and individuals), and works. Procurement support to each project implementing entity will be provided by a procurement officer supported by a procurement specialist (EPM at PPL; PT/OE at NEA)— for PPL, the procurement specialist will be full-time, for NEA, part-time. The procurement processes for priority start-up activities will also be supported by way of Hands-on Expanded Implementation Support (HEIS), including facilitating the procurement processes, training on the use of procurement systems and additional capacity building. Early market sounding will be important to understand local and regional conditionality and to identify potential impediments to the adoption of various market approaches. This should also include donor mapping to see where collaborative approaches with other multilateral development banks and bilateral partners can be utilized to speed up preparatory activities that will ensure the implementing entities are supported to do the detailed analysis that will inform investments, as well as streamline implementation arrangements. Setting clear parameters contextualized at a country level from the outset with regards to targets for sustainability, waste reduction, and the use of recyclable materials targets, will also be important to ensure consideration is deliberative.

[49] Procurement assessment was conducted in January 2023.

37. **Forced labor risk**. There are allegations of forced labor risks associated with the polysilicon suppliers, and the risk is moderate due to the relatively small scale. The IEs 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 IEs will include enhanced language on forced labor in the procurement contracts. Under ESS2, where there is a significant risk of forced labor related to primary supply workers, the IEs will require the primary supplier to identify those risks and if forced labor cases are identified, require the primary supplier to take appropriate steps to remedy them. Ultimately, if remedy is not possible, the IEs 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. Before beginning the procurement process, the IEs will undertake a market analysis to identify the possible sellers of solar panels for the proposed 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 not engage or employ any forced labor among their work force. The World Bank will prior review procurements of solar panels and components to ensure that the IEs use enhanced provisions.

C. Legal Operational Policies

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

D. Environmental and Social

38. The project is expected to have long-term positive impacts for target communities in the areas of health, education, safety, and economic development, as well as in the reduction of GHG emissions resulting from the electricity generation from renewable sources. The E&S risks and potential impacts associated with the project have been assessed as **Substantial** due to the associated E&S impacts of the proposed activities, limited implementing agencies' experience and capacity in managing these risks, and the current uncertainty on the project locations.

39. The project will be implemented in accordance with the World Bank's Environmental and Social Standards with the exception of Subcomponent 1.3 which will be implemented in accordance with OP 4.03 Performance Standards for Private Sector Activities (PSs).

40. Key social risks and potential impacts associated with the project include: (i) land and livelihood impacts associated with the establishment of sites/easements for on-grid, mini-grid and micro-grid electricity generation, storage and Medium/Low Voltage distribution infrastructure; (ii) inequitable access to expanded electricity services within communities (i.e. ability to afford access to expanded electricity services and products, and risk of indebtedness) particularly for vulnerable social groups (widows, single mothers, disabled, elderly); (iii) social tensions, conflict and civil unrest between diverse cultural groups/communities resulting from real or perceived inequities concerning selection of target sites/communities; (iv) community health and safety risks associated with construction and labor influx (i.e. antisocial behavior, transmissible disease and sexual exploitation and abuse and sexual harassment), as well as safety risks associated with the supply and use of electricity in communities; and (v) labor and working condition risks, including risks within the Solar PV panel supply chain concerning polysilicon suppliers and risks associated with the privatization of existing mini-grid(s).

41. Key environmental risks and potential impacts include potential generation of hazardous waste, particularly polychlorinated biphenyl (PCB)-contaminated waste, from the substation upgrade under Component 1, potential habitat

loss/fragmentation particularly related to the development of micro-grids which may be in greenfield area, construction related risks such soil erosion, dust and noise, pollution from inadequate waste management, occupational and community health and safety. The potential risks during operations include pollution from inappropriate waste management (e.g., used solar PV), fire risk from faulty wiring, electrocution risk for workers, and risk to wildlife (e.g., birds and bats) related to collision and electrocution. TA activities under Component 3 may have downstream E&S impacts, particularly on the activities supporting technical studies for small Hydropower Plants (HPP), downstream environmental impacts include sedimentation, loss of terrestrial habitats, disturbance to aquatic life, and dam safety risks. As subproject prioritization and design will be confirmed during project implementation, an 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 also outlines institutional arrangements, roles and responsibilities and reporting procedures for E&S management and monitoring, provides an indicative plan for training, capacity building and technical assistance and budget needed to successfully implement the provisions of the ESMF and associated instruments.

42. A number of other tools have also been developed as part of the ESMF and its annexes, including E&S screening forms for eligible investments, SEA/SH Action Plan, Labor Management Procedure (LMP) (including Workers Grievance Redress Mechanism), Indigenous People Policy Framework and Chance Finds Procedure. A Land Access and Resettlement Framework (LARF) has been prepared to guide the management of potential land acquisition and resettlement impacts associated with sub-projects. The LARF establishes the principles, objectives, procedures, and rules to be used to manage land acquisition and associated impacts. This includes processes and tools for negotiated settlement, voluntary land donation, and involuntary resettlement. A Stakeholder Engagement Plan (SEP) (including Grievance Redress Mechanism) and an Indigenous Peoples Policy Framework have also been prepared. The requirements and actions emanating from the ESMF, including on the requirements to develop site-specific E&S instruments, are captured in the Environmental and Social Commitment Plan (ESCP). For mini-grid development under Subcomponent 1.3, E&S requirements are outlined in the ESMF, LARF, LMP, SEP and the ESCP. This includes criteria for site selection based on the pre-feasibility study reports and E&S scoping assessment that are being prepared with IFC transaction advisory assistance, as well as the exclusion criteria in the ESMF. PPL have committed through the ESCP, and the PPL Project Agreement to ensure the private project company (mini-grid concessionaire), through the bidding process and VGF grant agreement, demonstrate E&S capacity through a documented Environmental and Social Management System (ESMS) consistent with PSs requirements and develop and implement relevant site-specific E&S assessments (e.g., Environment and Social Impact Assessment (ESIA)/ Environment and Social Management Plan (ESMP), operational ESMP and land due diligence and/or resettlement plans). PPL through the ESCP and the PPL Project Agreement has also committed to including requirements for managing PPL mini-grid workforce (Subcomponent 1.3) in accordance with PS2 in the VGF grant agreement. E&S instruments were disclosed on the World Bank's website on February 8, 2024, and May 31, 2024, and on the PPL and NEA websites on September 21, 2023, February 26 and 27, 2024.

E. Gender

43. While PNG has made strides to protect women from discrimination in the workplace, several legal constraints on women's employment persist, including the lack of paid maternity leave, a high care burden, and high rates of sexual harassment.[50] Women remain largely underrepresented in the energy sector including renewable energy more broadly in the Pacific. The forthcoming baseline data collected by the World Bank Pacific Women in Power (PWIP) program, in collaboration the Pacific Power Association, indicates that the total PPL employees as of January 2024 is 1,653, of which 18 percent are women. Women occupy 11 percent of management positions. In access to energy services, several gaps exist, with women lagging in access to energy services driven by income gaps, despite female-led households showing higher interest in clean and sustainable energy services. Nationwide, male-headed households (MHH) are much more likely (74 percent) to have access to electricity, compared to female-headed households (FHH) (54 percent), driven by

[50] World Bank (2023) Papua New Guinea Economic Update, March 2023: Unlocking the Economic Benefits of Gender Equality.

access to off-grid solutions.[51] Among households that are not connected to the grid, FHH report significantly higher willingness to pay for a grid connection with upfront payment, compared to MHH. Given the significant gender gaps, the PWIP program will support the proposed project to build on regional efforts and drive progress on creating job opportunities for women in the sector. Key interventions will focus on women's employment and leadership at PPL, micro-grids and off-grid solar companies by providing TA to enhance women's employment. The TA will be provided to participating companies under the project to understand and address technology adoption barriers for women as households and business owners and progress towards more equitable consumer engagement and targeting given the access gaps identified especially for FHH. Further, a baseline will be established on women's employment for the micro-grid and SHS sector as nothing currently exists.

F. Citizen engagement

44. The proposed project will engage the community in consultation throughout implementation, focusing on identified project-affected customers and stakeholders. The engagement will begin early in the project cycle, providing stakeholders with an opportunity to influence project planning and design (e.g., identifying suitable locations for micro-grids and LV drop line to HH), and will continue during construction, and O&M phases. Customers newly connected to the grid or off-grid solutions will be invited to awareness raising programs and to provide feedback through a questionnaire. For PPL, the proposed project will be able to utilize its existing user feedback mechanism (National Call Center and contact by email) to obtain feedback from existing and newly connected customers. The comments and feedback derived from the questionnaire and/or existing mechanism will be monitored and evaluated under the project's Results Framework. Mechanisms for customers served by micro-grid service providers and solar companies to provide feedback will be defined in NEA's PIM.

V. GRIEVANCE REDRESS SERVICES

45. ***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*.

VI. KEY RISKS

46. The overall risk of the proposed project is *Substantial*, considering that the Political and Governance, Macroeconomic, Sector Strategies and Policies, Technical Design, Institutional Capacity for Implementation and Sustainability, Fiduciary, E&S and Stakeholders risks are rated *Substantial*. The key risks for the proposed project are

[51] MTF data

described in the following paragraphs.

47. **Political and Governance**. The political and governance risk is rated *Substantial*. Since the establishment of the NEA which has consolidated both technical and economic regulatory functions for the energy sector, the sector's institutional landscape has been clarified and coordination mechanisms are being established, with signs of collaboration emerging across different stakeholders. The energy sector had high turnover of leadership that has caused inconsistent decisions in the past, but there is willingness to stabilize both NEA and PPL and work on a substantive agenda. The project will seek to engage all key stakeholders and support the GoPNG to establish a strong platform for coordinating electrification efforts.

48. **Macroeconomic**. The macroeconomic risk is rated *Substantial*. PNG is highly reliant on commodities and vulnerable to economic shocks. The COVID-19 pandemic and international conflicts have caused worldwide supply shortages, disrupted supply chains, and inflation. Access to foreign currency is particularly a significant risk for the purchase of materials, products, and services that are needed for project implementation (for example solar products). Implementing Entities will be able to use Direct Payment method to mitigate the impact of foreign currency availability, and HEIS during project preparation has tried to bring forward planning for procurement anticipating global delays.

49. **Sector Strategies and Policies.** This risk is *Substantial*. PNG's broader effort to develop the energy sector focuses on sustainability, accessibility, and economic growth. Effective planning and implementation are crucial, including NEROP and NEA establishment. Despite the ambitious strategies and policies, geographical diversity and remote locations pose significant challenges in effectively developing and maintaining energy infrastructure, and these also pose challenges in government policies or instability that may affect the continuity and consistency of energy strategies and policies. During implementation, NEA, which also has a role of policy maker and regulator, will be supported by qualified international consultants and experts to review, and update relevant strategies and policies, and collaborate with PNG Electrification Partnership, PNG Center of Renewable Energy, government officials, and development partners.

50. **Technical Design of Project or Program**. This risk is *Substantial* given that off-grid investments are relatively new to PNG, thus adopting and integrating new technologies in the energy sector may be hindered by limited local expertise and resources. The pilot PPP in PPL mini-grids is also new to PNG, but this will be mitigated through a pilot approach and IFC transaction advisory service. The O&M practice for micro-grids and SHS investments will need to be established. These risks are mitigated to some extent as the proposed project is fully aligned with the energy sector priorities. The proposed project will adopt technologies that are proven worldwide and in accordance with relevant international quality standards and qualified product requirements. PPL and NEA will be supported by qualified international engineers and other experts during the implementation. O&M requirements will be specified in the terms and conditions for the micro-grid service providers and participating solar companies to ensure sustainability.

51. **Institutional Capacity for Implementation and Sustainability**. Institutional risks are rated as *Substantial* after the mitigation measures adopted in the project. PPL has been suffering from large and continuous losses over the years, and thus is unfunded every year for corporate activities across the company. It is therefore necessary under Components 3 and 4, to support the institutional development of PPL to plan, coordinate, and implement grid rehabilitation and upgrade on-grid NEROP scope and small HPP development. The project adopts an EPM model used by other infrastructure sector projects, whereby project implementation will be detached from PPL's day-to-day operations to the extent feasible. NEA, a newly established entity with a new legal mandate, has limited institutional capacity however a recruitment drive is under way for key managerial and staff positions. For this reason, the project will allocate substantial resources under Components 3 and 4 to support the institutional development of NEA to plan, coordinate, and implement the NEROP, in addition to PPL through partnership, to foster climate- friendly innovative technology to achieve energy sustainable goals in accelerating electrification demand by supporting mini-grids through a strengthened institutional structure.

52. **Fiduciary**. The fiduciary risk is *Substantial* primarily due to weakness in both NEA and PPL's fiduciary capacity and management practices. For PPL, internal and external reports have raised significant weaknesses and concerns about its

fiduciary capacity and financial performance. KCH has prepared a PPL Corporate Plan aimed at addressing these issues. NEA is a new entity that needs significant capacity building to fulfill its fiduciary responsibilities. The proposed project will safeguard these risks by ring-fencing activities, including installing an EPM at PPL and a PT/OE at NEA along with the contracting of a Grant Administrator and an IVA to manage the grant funding component. As part of fiduciary risk mitigation, EPM and PT/OE readiness will be a dated covenant and the grant administration arrangements will be a disbursement condition.

53. **Environment and Social**. The Environment and Social (E&S) risk is assessed to be *Substantial* due to the associated E&S impacts of the proposed activities, limited implementing entities' experience and capacity in managing these risks, and current uncertainty on the project locations. An ESMF, LARF, SEP, LMP, and associated instruments have been prepared to guide management of E&S risks during implementation. The ESCP outlines material E&S measures and actions. The potential risks and impacts, as well as capacity, will be further assessed and mitigation measures to address the risks will be provided through the preparation of E&S instruments during project implementation.

54. **Stakeholders**. The stakeholders' risk is *Substantial* given stakeholders in the energy sector face a complex array of risks, ranging from regulatory and infrastructural challenges to environmental and financial considerations. Given the ongoing efforts to reform and develop the electricity sector, stakeholders face risks associated with infrastructure development. This includes the reliability of the power supply, the distribution network, and the challenge of extending electricity to rural and remote areas. In addition, with a focus on renewable energy development, stakeholders must navigate the uncertainties and technological challenges associated with transitioning to renewables, the availability of funding and the economic feasibility of energy projects. The proposed project addresses infrastructure development including reliability, distribution network expansion, RE development through mini-grid and micro-grid, and funding support through PPP and grants to attract the private sector.

VII. RESULTS FRAMEWORK AND MONITORING

PDO Indicators by PDO Outcomes

Baseline	Period 1	Period 2	Period 3	Period 4	Period 5	Period 6	Closing Period
To increase access to renewable energy and enhance the reliability of the electric supply.							
Projected lifetime greenhouse gas (GHG) net emissions reduction from results achieved (Metric ton)							
Aug/2023	Dec/2024	Dec/2025	Dec/2026	Dec/2027	Dec/2028	Dec/2029	Dec/2030
0	0	30,193	31,562	117,098	277,851	373,709	437,842
Reduction in system average interruption frequency index (SAIFI) in the Port Moresby grid (Number)							
Aug/2023	Dec/2024	Dec/2025	Dec/2026	Dec/2027	Dec/2028	Dec/2029	Dec/2030
182	182	182	175	168	162	157	152
Renewable energy capacity enabled (Megawatt)							
Aug/2023	Dec/2024	Dec/2025	Dec/2026	Dec/2027	Dec/2028	Dec/2029	Dec/2030
0	0	0	0	4.6	5.7	6.8	7.7
Reduction in system average interruption frequency index (SAIFI) in the Ramu grid (Number)							
Aug/2023	Dec/2024	Dec/2025	Dec/2026	Dec/2027	Dec/2028	Dec/2029	Dec/2030
294	294	294	263	237	215	196	180
People provided with new or improved access to electricity (Number)							
Aug/2023	Dec/2024	Dec/2025	Dec/2026	Dec/2027	Dec/2028	Dec/2029	Dec/2030
0	0	17000	61100	131710	217790	312770	425650

Intermediate Indicators by Components

Baseline	Period 1	Period 2	Period 3	Period 4	Period 5	Period 6	Closing Period
Component1: Rehabilitation, reliability enhancement of PPL infrastructure, and on-grid electrification							
Transformers rehabilitated, cumulative (Number)							
Aug/2023	Dec/2024	Dec/2025	Dec/2026	Dec/2027	Dec/2028	Dec/2029	Dec/2030
0	0	0	0	0	5	5	15
Distribution lines constructed, rehabilitated, or enabled, cumulative (Kilometers)							
Aug/2023	Dec/2024	Dec/2025	Dec/2026	Dec/2027	Dec/2028	Dec/2029	Dec/2030
0	0	0	10	20	30	40	50

PPL has mobile substation (Yes/No)							
Aug/2023	Dec/2024	Dec/2025	Dec/2026	Dec/2027	Dec/2028	Dec/2029	Dec/2030
No	No	No	No	Yes	Yes	Yes	Yes
Efficiency improvement at targeted substations (Percentage)							
Aug/2023	Dec/2024	Dec/2025	Dec/2026	Dec/2027	Dec/2028	Dec/2029	Dec/2030
0	0	0	0	0	9.9	9.9	35.2
Private capital enabled (cumulative) (Amount (USD))							
Aug/2023	Dec/2024	Dec/2025	Dec/2026	Dec/2027	Dec/2028	Dec/2029	Dec/2030
0	0	0	0	1,000,000	2,000,000	7,000,000	8,000,000
Component2: Renewable energy micro-grids and rural energy market development							
Annual electricity consumption from renewable energy facilities under the project (Gigawatt-hour (GWh))							
Aug/2023	Dec/2024	Dec/2025	Dec/2026	Dec/2027	Dec/2028	Dec/2029	Dec/2030
0	0	0	0.04	0.48	1.35	2.26	3.06
Annual off-grid solar products sold under the project (Number)							
Aug/2023	Dec/2024	Dec/2025	Dec/2026	Dec/2027	Dec/2028	Dec/2028	Dec/2030
0	0	0	2000	4000	6000	8000	16000
Component3: Energy sector institutional development							
Small Hydropower plants pre-feasibility study completed (Yes/No)							
Aug/2023	Dec/2024	Dec/2025	Dec/2026	Dec/2027	Dec/2028	Dec/2029	Dec/2030
No	No	No	No	Yes	Yes	Yes	Yes
Component4: Project management							
Newly grid-connected household confirms satisfaction with services received (Percentage)							
Aug/2023	Dec/2024	Dec/2025	Dec/2026	Dec/2027	Dec/2028	Dec/2029	Dec/2030
0	0	30	30	50	50	50	50
Micro-grid and solar-home system companies engaged under the project who adopting a women's employment strategy at the business level (Percentage)							
Aug/2023	Dec/2024	Dec/2025	Dec/2026	Dec/2027	Dec/2028	Dec/2029	Dec/2030
0	0	20	40	50	60	70	80
Overall increase in the share of women employees in PPL (Percentage)							
Aug/2023	Dec/2024	Dec/2025	Dec/2026	Dec/2027	Dec/2028	Dec/2029	Dec/2030
0	0	2	2	2	4	4	5
Share of women in managerial positions in PPL (Percentage)							
Aug/2023	Dec/2024	Dec/2025	Dec/2026	Dec/2027	Dec/2028	Dec/2029	Dec/2030
11	11	14	14	16	18	18	20

ANNEX 3: Republic of the Marshall Islands: Renewable Energy Generation and Access Increase Project (P181250)

COUNTRY: Republic of the Marshall Islands
Renewable Energy Generation and Access Increase Project (P181250)

DATASHEET

BASIC INFORMATION

Project Beneficiary(ies)	Operation Name		
Marshall Islands	Renewable Energy Generation and Access Increase Project		
Operation ID	Financing Instrument	Environmental and Social Risk Classification	
P181250	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
24-Sep-2024	30-Sep-2030	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

Proposed Development Objective(s)

To (i) increase renewable energy generation and (ii) improve the reliability and quality of electricity service in targeted main and outer islands.

Components

Component Name	Cost (US$)
Component 1: Renewable Energy and Network Upgrade in Main Grids	43,000,000.00
Component 2: Improved Electricity Access in Outer Atolls	12,500,000.00
Component 3: Institutional Strengthening and Implementation Support	4,500,000.00

Organizations

Borrower:	Republic of Marshall Islands
Implementing Agency:	Marshalls Energy Company (MEC)

MPA FINANCING DETAILS (US$, Millions)

MPA 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	**60.00**
Total Financing	**60.00**
of which IBRD/IDA	**60.00**
Financing Gap	**0.00**

DETAILS

World Bank Group Financing

International Development Association (IDA)	60.00
IDA Grant	60.00

IDA Resources (US$, Millions)

	Credit Amount	Grant Amount	SML Amount	Guarantee Amount	Total Amount
National Performance-Based Allocations (PBA)	0.00	60.00	0.00	0.00	60.00
Total	**0.00**	**60.00**	**0.00**	**0.00**	**60.00**

Expected Disbursements (US$, Millions)

WB Fiscal Year	2024	2025	2026	2027	2028	2029	2030	2031
Annual	0.00	1.00	2.00	7.00	20.00	15.00	12.00	3.00

Cumulative	0.00	1.00	3.00	10.00	30.00	45.00	57.00	60.00

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	Low
4. Technical Design of Project or Program	Moderate
5. Institutional Capacity for Implementation and Sustainability	Substantial
6. Fiduciary Financial Management Risk rating from Specialist: Moderate as of 2023-11-22T07:11:27Z No Procurement rating under Preparation Phase has been completed in PRAMS to date.	Substantial
7. Environment and Social Environment Risk rating from Specialist: Moderate as of 2024-04-19T01:38:24Z Social Risk rating from Specialist: Moderate as of 2024-04-19T01:38:24Z	Moderate
8. Stakeholders	Low

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
Financing Agreement–Schedule 2–Section I-A-1-(a): The Recipient shall, maintain throughout implementation of the Project, the Project Steering Committee ("PSC") with mandate, composition and resources satisfactory to the Association, which shall be responsible for providing oversight and strategic guidance for the Project.
Financing Agreement–Schedule 2–Section I-A-2-(a): To ensure the proper and efficient implementation of the Project, the Recipient shall cause the Project Implementing Entity to at all times during the implementation of the Project, maintain a Project Implementation Unit ("PIU"), with terms of reference and resources acceptable to the Association, to be responsible for, inter alia, overseeing implementation and monitoring of the Project, including environmental and social risks management, procurement, and financial management.
Financing Agreement-Schedule 2-Section I-C-1: To facilitate the carrying out of the Project, the Recipient shall make the proceeds of the available to the Project Implementing Entity in the form of a grant under a subsidiary agreement between the Recipient and the Project Implementing Entity, under terms and conditions approved by the Association ("Subsidiary Agreement").
Financing Agreement-Schedule 2-Section I-E-2-(d): Without limitation upon paragraph 1 above, the Recipient shall, and shall cause the Project Implementing Entity to, ensure that the Project is implemented in accordance with the Environmental and Social Commitment Plan ("ESCP"), in a manner acceptable to the Association. To this end, the Recipient shall, and shall cause the Project Implementing Entity to, ensure that the ESCP, or any provision thereof, is not amended, repealed, suspended or waived, except as the Association shall otherwise agree in writing, as specified in the ESCP, and ensure that the revised ESCP is disclosed promptly thereafter.

Conditions

Type	Citation	Description	Financing Source
Effectiveness	Financing Agreement–Article IV-4.01	The Additional Condition of Effectiveness consists of the following, namely that the Recipient has prepared and adopted a Project Implementation Manual in accordance with Section I.B of Schedule 2 to this Agreement.	IBRD/IDA
Disbursement	Financing Agreement-Schedule 2-Section III-B-1-(b)	Notwithstanding the provisions of Part A of this Section, no withdrawal shall be made: under	IBRD/IDA

		Category (2), unless and until the Recipient's Cabinet has approved an amendment to the Project Implementing Entity's Corporate Charter to expand the Project Implementing Entity's service area to include Kili Island in a manner satisfactory to the Association.	

I. STRATEGIC CONTEXT

A. Country Context

1. The Republic of the Marshall Islands (RMI), a middle-income economy, is one of the world's smallest and most isolated nations. The country consists of 29 atolls and 5 low coral islands situated on about 181 square kilometers (km^2) of land mass in the Pacific Ocean. Majuro (the nation's capital) and Ebeye, the country's two largest urban centers, account for about 96 percent of total population[52] while the remaining inhabit on outer atolls. Economically, it is a middle-income country with Gross National Income of US$5,403 per capita and faces many of the development challenges common to small, remote island economies with dispersed populations. The public sector accounts for around 40 percent of GDP and employs half the formal labor market. Key industries include production of copra and craft items, tuna processing, construction, and tourism. RMI has a narrow export base and limited production capacity, while it relies heavily on imports, making it susceptible to external shocks. The remoteness and territorial dispersion also heighten transport costs which surges costs of trade and fundamentally undermines its competitiveness of exports of goods and services in world markets.

2. Due to its geographical location and low-lying terrain characteristics, RMI is extremely vulnerable to natural disasters and climate change. The key climate-related hydro-meteorological hazards include flash flood, rising sea level, storm surge and droughts. World Bank catastrophic risk modeling estimated that RMI is expected to incur average annual losses of US$3 million due to typhoons and earthquakes and in the next 50 years, RMI has a 50 percent chance of experiencing a loss exceeding US$52 million and a 10 percent chance of experiencing a loss exceeding US$160 million. RMI is a leader in the global climate dialogue and committed to reducing GHG emissions economy wide by 32 percent below the 2010 level by 2025, with additional targets of 45 percent by 2030, and net zero emissions by 2050. In 2018, RMI released its 2050 Climate Strategy, which outlines its plan to achieve its objectives for net zero emission and 100 percent renewable energy, as well as to facilitate adaptation and climate resilience to advance a more resilient and prosperous RMI.

B. Sectoral and Institutional Context

3. The energy sector and institutional context in RMI is characterized by relatively recent institutional developments with ongoing consideration of legal framework strengthening, ambitious decarbonization targets, and significant power sector development challenges. The RMI cabinet of ministers currently retains the sector regulation and remains the key decision maker. Nonetheless, the 2018 Electricity Roadmap provides a relevant and guiding framework for the sector's development, which is supported by several development partners, including the World Bank. The proposed project constitutes a critical leap towards achievement of the sector goals, including its sustainable development.

Institutional Context

4. The Ministry of Environment in RMI, established by the 2018 Ministry of Environment Act, oversees climate and energy policies, including environmental protection and climate action. It was established by a 2018 Act (2018 Ministry of Environment Act) to enhance coordination on environmental protection, sustainable energy, and climate change mitigation and adaptation. It includes the Environment Protection Agency, Climate Change Directorate, National Council on Environment, and National Energy Office (NEO). The Climate Change Directorate formulates and enforces climate

[52] RMI's population is estimated at 42,155. Of the total, Majuro and Ebeye have population of 25,400 and 15,000, respectively. Source: https://worldpopulationreview.com/countries/marshall-islands-population

policies and acts as the liaison for climate agreements and funding. The Act urges climate-proofing for all government policies and projects. NEO's mandate includes the development and implementation oversight of energy policies (with associated strategies and action plans); promotion of renewable energy and energy efficiency; and monitoring of electricity tariffs and quality of imported petroleum products. NEO also serves as the central repository for data collection, analysis, and reporting.

5. The 2016 Energy Policy, 2018 Electricity Roadmap, and NDC of the Government of the Republic of the Marshall Islands (GoRMI) are the current key sector policies, strategies, and goals. The first National Energy Policy was revised in 2016 and aimed to achieve four priority outcomes: (i) improved enabling frameworks for reducing dependence on imported fossil fuels; (ii) equitable access to modern energy services for all Marshallese; (iii) efficient use of energy in households, businesses, government, transport, and power utilities; and (iv) reliable, sustainable, and affordable energy supply. In 2018, RMI submitted an enhanced NDC with ambitious commitments to reduce GHG emissions economy-wide by 32 percent (below the 2010 levels) by 2025, further 45 percent by 2030, and achieve net zero emissions by 2050. To provide a coordinated and strategic framework to reduce GHG in the electricity sector – the largest contributor of GHG emissions – the GoRMI developed and published the 2018 Electricity Roadmap, which provides technology pathways, human resource strategies, and enabling policies to achieve RMI's vision of a decarbonized electricity sector. Efforts are ongoing to strengthen the sector legal and regulatory frameworks. This involves (i) a National Energy Commission (NEC) bill to transform the NEO into a NEC (with new regulatory functions) and (ii) an Energy Bill to include provisions for private sector involvement.

6. The two state-owned energy utilities—Marshalls Energy Company (MEC) and Kwajalein Atoll Joint Utilities Resources (KAJUR)—are the key power sector operators. The Cabinet of RMI established MEC by corporate charter in 1984 to generate, supply, and commercialize electricity in Majuro Atoll as well as to purchase and sell petroleum products. The cabinet extended MEC's mandate in 1993 and 2000 to include the development, operation, and management of power generation and distribution infrastructure in Jaluit and Wotje Atolls. Between 2005 and 2018, the GoRMI requested and provided funding to MEC to take over the installation and maintenance of solar home systems (SHS) in 28 outer islands. The MEC manages 74 percent of the installed power generation in the Marshall Islands as well as fuel storage tanks and a tanker vessel. Much smaller than MEC, KAJUR was established in 1990 and has been responsible for power generation and distribution, potable water production and supply, and sewerage services in Ebeye, a 40-hectare islet in the Kwajalein Atoll. KAJUR receives fuel for power generation and technical assistance from MEC. Both MEC and KAJUR operate under the strategic direction of a Combined Utilities Board (CUB), whose members—including the chairman who is the Minister of Works, Infrastructure, and Utilities—are appointed by the Cabinet of RMI. Following a 2006 Cabinet decision, the CUB delegated KAJUR management responsibilities to MEC's Chief Executive Officer. Thus, KAJUR has since been under MEC management.

Power sector overview and challenges

7. Reflecting the island context, RMI's power system comprises two main grids, six mini-grids and SHS, which provide differentiated levels of access to electricity to almost all Marshallese. The GoRMI estimates suggest that over 97 percent of Marshallese have access to electricity. The overall installed (nameplate) power capacity in RMI is 43 MW, of which 41 MW (95 percent) are of diesel-fuel power generation and 2 MW (5 percent) of renewable solar photovoltaic (PV) (both grid-tied solar PV and stand-alone solar). Majuro's main grid, serving 55 percent of RMI's population, has a 35 MW capacity for 5,390 customers (mostly through prepaid meters), with demand expected to rise from 10 MW in 2022 to 20 MW by 2030. Ebeye's grid, serving 20 percent of the population, has a 4.8 MW capacity for 1,340 customers, with demand projected to increase from 2.5 MW in 2022 to 5 MW in 2030. MEC also manages three mini-grids in Jaluit, Wotje, and Rongrong serving 230 customers with a 1.1 MW capacity, and local governments run three micro grids with funding support from the US. Around 3,000 SHS are installed in outer atolls, with varying service levels.

8. RMI's energy sector dependence on imported diesel, which accounts for 95 percent of power capacity and 48 percent of the nation's diesel imports, raises energy security issues, and hinders NDC target achievement. 95 percent of the total installed power capacity are diesel-fired generators. MEC and KAJUR use about 6.24 million US gallons of diesel a year to run their power generators, almost half of the total annual diesel imports in the country. This high reliance on imported fuels makes RMI's economy vulnerable to price fluctuations and constitutes an energy security threat. In addition, the power sector is currently the highest emitter of GHG—accounting for 52 percent of 2010 national emissions—and the Electricity Roadmap targets a 50 percent reduction of GHG in the power sector by 2025, and 65 percent reduction by 2030. Addressing the challenge hinges on boosting renewable energy amidst challenges, including: (i) limited land for solar PV; (ii) deep waters around atolls hindering offshore generation; and (iii) a lack of supportive regulations.

9. MEC's financial position has significantly improved, but the viability of electricity service operations needs to be enhanced further. World Bank analysis shows MEC's finances improved from negative (2006-2015) to positive (2016-2021). MEC's average net profit was US$3.5 million, excluding fuel sales, but underfunded maintenance and inadequate depreciation practices persist, alongside US$2.1 million annual subsidies. Without subsidies and proper accounting for maintenance and depreciation, MEC's financials would be unstable due to high diesel costs and fixed electricity tariffs. Opportunities for financial improvement include cutting fuel use, reducing losses, revising tariffs for sustainability, and optimizing subsidies.

10. The reliability of electricity service has been below Pacific Islands average mainly because of limited maintenance, exposure to climate and natural hazards, and defective protection systems. Among utilities in the Pacific, MEC and KAJUR report the longest power outages, with System Average Interruption Duration Index (SAIDI) at 5,490 and 5,421 minutes per customer, respectively, in the 2021 benchmarking report of Pacific Power Association (PPA). Aging MEC generators, 19-36 years old with scant maintenance, leave just 41 percent of diesel capacity operational. In January 2024, multiple generator failures led to severe outages and a state of emergency. Over half of the SHS in outer islands are inoperative, affecting tourism development in areas like Arno Atoll. The reliability of power is also compromised by climate damage to the distribution network assets and lack of redundancy. Coastal infrastructure faces flooding and corrosion, necessitating elevation of pad-mounted transformers, sectionalizing units, and underground cable splices. Majuro and Ebeye's radial networks lack interconnections, further affecting reliability.

11. Capacity needs to be strengthened across the energy sector. Energy expertise and capacity are scarce; NEO has just four professionals and a small budget, needing urgent help with policy, data, and planning. NEO's transformation into NEC will require support in regulation, economics, renewable integration, and efficiency. MEC employs only two new electrical engineers and one certified technician; KAJUR has none. MEC's labor productivity is low, with many low-skilled workers. The Electricity Roadmap indicates a need for a 16 percent staff increase, with skilled engineers for RE systems and upgrades, but there is little motivation for graduates to enter Science, Technology, Engineering, and Mathematics (STEM) fields. The energy sector has low female participation and is not actively nurturing female talent to diversify its workforce.[53]

Development Partners Support and Proposed Project

12. The World Bank is funding the largest energy sector project in the RMI, but more needs to be done. The Sustainable Energy Development Project (SEDeP, P160910)—an International Development Association (IDA) grant of US$34 million—aims to increase the share of renewable energy generation, enhance reliability of electricity supply, and improve energy efficiency. SEDeP is implemented by MEC, with support on procurement, FM, safeguards from the Central

[53] E.g., IFC (2013) Investing in Women's Employment. Good for Business Good for Development. Washington, D.C.

Implementation Unit (CIU), hosted within the Ministry of Finance Budget and Postal Services (MFBPS)'s Division of International Development Assistance (DIDA). Though SEDeP implementation was significantly delayed by lengthy procurement to select key contractors, late staffing of the Project Implementation Unit (PIU), weak MEC operational capacity, and two years of borders closure from COVID-19 pandemic, the project performance is overall moderately satisfactory with notable achievements.[54] By the project closing date (October 31, 2024), SEDeP is expected to add 4 MW of renewable energy generation which will increase the share of renewable energy generation from 2 to 9 percent.

13. The proposed Renewable Energy Generation and Access Increase Project ("the Project") would further increase renewable energy generation initiated through SEDeP, and embrace new interventions areas to enhance resilience, improve electricity access, and strengthen institutions. The Project seeks to lessen reliance on diesel for power generation—thereby reducing GHG emissions and supporting RMI's renewable energy targets and improving the financial situation of the power utilities—by integrating additional renewable energy (solar PV) in the power generation mix of the two main grids and the MEC-operated three mini-grids. Unlike SEDeP, the Project will no longer install diesel generation in Majuro and Ebeye. Going beyond SEDeP's intervention areas, the Project would help address distribution system bottlenecks in the targeted grids through upgrades to enhance the resilience of power infrastructure, thereby improving the reliability of the electricity service. The Project would also improve the quality of electricity access in Arno Atoll by providing grid-level service. The Project would also strengthen the capacity of key energy sector stakeholders by targeting electricity sector regulation, monitoring tools, and power utility operation. The Project design and preparation will incorporate key lessons learned from SEDeP to improve implementation performance.

C. Relevance to Higher Level Objectives

14. The Project is aligned with the World Bank's mission on energy. It will contribute to "boost shared prosperity in a livable planet" by reducing GHG emissions, improving local air pollution, enhancing resilience to climate and natural hazards, and providing better electricity service in underserved outer islands through reduction of the quantity of diesel fuel used for power generation, resilience enhancement upgrades, and replacement of SHS service by mini-grid service level in targeted outer islands. The project is in line with the objectives under SDG7: (i) scale up energy efficiency, (ii) expand and improve access, (iii) increase renewable energy integration, (iv) phase down fossil fuels, and (v) decarbonize hard-to-abate sectors, including transport. In line with these objectives, the Project will include activities to promote energy efficiency, improve the quality of electricity service, increase renewable energy generation, and reduce the use of diesel fuel for power generation.

15. The Project is consistent with the latest World Bank's FY17-FY23 Regional Partnership Framework[55] (RPF) and the updated FY2023 Pacific Islands Systematic Country Diagnostic (SCD). The Project will support the achievement of two objectives of the latest FY17-FY23 RPF. By upgrading distribution network assets and enabling more redundancy to enhance the resilience of the main Majuro and Ebeye grids against natural disasters and climate, the Project will help achieve RPF Objective 3.1 – strengthened resilience to natural disasters and climate change. In addition, by constructing mini-grids in Arno Atoll and rehabilitating distribution networks to improve the reliability and quality of electricity access, the Project will contribute to RPF Objective 4.2 – increased access to basic services and improved connectivity infrastructure. Further, the Project focuses on some SCD-identified priority solution areas such as strengthening climate and disaster risk policies by providing technical assistance to enhance regulation, and policy formulation. Also, the Project

[54] Achievements to date include: (i) implemented energy efficiency measures (replaced airport lighting and energy inefficient sewerage pumps); (ii) conducted an e-mobility initiative (acquisition of four electric vehicles and installation of charging stations); (iii) piloted the installation of a 40 kWp solar PV sidewalk in Ebeye; (iv) funded prefeasibility studies for the hybridization of three diesel power plants in Jaluit, Wotje and Rongrong; and (v) completed the electrification of Arno and Ine islands in Arno Atoll. On generation, SEDeP: (i) supplied 4.8 MW of emergency diesel generation to KAJUR; (ii) is funding 7.5 MW of diesel generators at MEC power plant; and (iii) is supplying equipment for the installation of solar PV.

[55] Report No. 100997-EAP. A new RPF for nine PICs (FY25-FY29) (P502465) is currently under preparation and is expected to be delivered in 2024.

will contribute to the implementation of the World Bank's corporate gender strategy 2024-2030 with its target for improving equal access to more and better jobs.

16. The Project is in line with RMI's 2050 Climate Strategy and National Adaptation Plan and will contribute to the achievement of its NDC. The long-term Climate Strategy[56] emphasizes the GoRMI's commitment to reduce GHG emissions. In the latest NDC submitted to the United Nations Framework Convention on Climate Change (UNFCCC), RMI committed to reduce GHG emissions by 32 percent (below 2010 level) by 2025, 45 percent by 2030 and to achieve net zero GHG emissions and 100 percent renewable energy by 2050. The Project will contribute to implementing the mitigation commitment by replacing carbon-intensive diesel generation with renewable energy. On adaptation, the Climate Strategy recommends the development of a National Adaptation Plan, which called for development of resilient energy infrastructure to better withstand growing risks posed by climate change. This includes improving the reliability of grids on Majuro and Ebeye and enhancing system serviceability on outer islands. Thus, the project interventions to enhance the resilience of power distribution network assets and utility operations for accelerated restoration are likely to support the GoRMI's adaptation efforts.

II. PROJECT DESCRIPTION

A. Project Development Objective

PDO Statement

17. The project development objective (PDO) is to (i) increase renewable energy generation and (ii) improve the reliability and quality of electricity service in targeted main and outer islands.

PDO Level Indicators

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

- Renewable energy capacity enabled with direct support, indirect support, and/or enabling policy support [MW]
- Reduction of unplanned power outages in the distribution network in Majuro and Ebeye [percentage]
- People provided with new or improved access to electricity [number]

Intermediate indicators will include:

- Projected lifetime net GHG emissions reduction from results achieved [tCO_2e]
- Installed capacity of battery energy storage [MWh]
- Increased share of women in technical, engineering, and/or management positions [percentage]

B. Project Components

19. The Project will increase the share of renewable energy generation, improve electricity service in targeted islands and strengthen the capacity (including gender inclusion) of key energy sector entities. The Project will fund renewable energy integration, distribution network and resilience enhancement upgrades, new hybrid mini-grids, technical assistance, and implementation support. The proposed activities represent a subset of the investment and technical assistance program outlined in the 2018 RMI Electricity Roadmap. Most investments were drawn from both MEC

[56] RMI. Tile Til Eo. 2050 Climate Strategy – Lighting the Way – September 2018.
https://unfccc.int/sites/default/files/resource/180924%20rmi%202050%20climate%20strategy%20final_0.pdf

and KAJUR's priority plans, and some investments (on resilience, mini-grids, and power plant hybridization) were informed by SEDeP-funded prefeasibility studies and World Bank-funded analytical work. On power generation, the project will enable the installation of about 8 MW of distributed solar PV plants and 15.2 MWh of battery storage in Majuro, Ebeye, Jaluit, Wotje, and Rongrong. Adding the expected 4 MW and 2 MWh from SEDeP (by 2025) to the proposed 8 MW of solar PV and 15.2 MWh of energy storage from the Project (by 2030), the two World Bank-funded projects will together install around 12 MW of solar and 17 MWh of energy storage of renewable energy generation, which will increase the share of available renewable energy capacity from 2 percent in 2017 to 24 percent by 2030. This would be a considerable contribution to the achievement of RMI's renewable energy targets, and a major relief from current heavy dependance on costly diesel generation. The Project activities are grouped into three components.

20. Component 1: Renewable Energy and Network Upgrade in Main Grids (US$43 million) will increase renewable energy generation and improve reliability of power supply, while enhancing resilience of distribution assets against climate/natural hazards by funding services, supplies, installation, and small works targeting generation, distribution, and operations in the Majuro and Ebeye Grids. This component consists of two sub-components:

- ***Sub-component 1.1 – Renewable Energy Integration in Majuro and Ebeye (US$31 million)*** will fund detailed studies, designs, supply, installation, commissioning, and supervision of 6.6 MW of distributed, grid-connected solar PV systems (including solar PV modules, Battery Energy Storage System (BESS), inverters, transformers, control systems, supervisory control and data acquisition, necessary roof strengthening or structure erection, and any other ancillary equipment) in Majuro and Ebeye grids. In Majuro, 4.0 MW of grid connected solar PV panels will be installed in various sites, including rooftops of school buildings, structures over basketball/volleyball courts, rooftops of hospital facilities, and canopies of parking lots, with 6 MWh of BESS. To help climate-proof the current generation and BESS as well sustain the electric vehicle uptake in Majuro the sub-component will also allocate resources to complete the construction of the MEC Power Station 1 Building and install few electric vehicle charging stations. In Ebeye, 2.6 MW of grid connected solar PV panels are envisioned to be installed on canopies erected along sidewalks of selected streets, structures over basketball courts and similar open areas, and rooftops of suitable public buildings (e.g., Ebeye Public Elementary School and Kwajalein Atoll Development Authority (KADA)) with 5 MWh of BESS. The solar PV equipment and its installation will comply with hurricane/storm resilient standards and practices (e.g., strengthened bolting, vibration resistant materials) drawn from internationally recognized publications.[57]

- ***Sub-component 1.2 – Majuro and Ebeye Network Upgrade (US$12 million)*** will upgrade selected feeders or distribution line segments (to enable additional renewable energy transfer), replace underground cable splices (under water during high tide events induced by climate change) by elevated sectionalizing cabinets, raise some pad-mounted transformers and switchgears (to avoid damage by climate change-induced tidal flooding) above surrounding levels, and supply critical/emergency operational vehicles and equipment (to accelerate recovery after natural/climate hazards). In Majuro, the distribution line between the Airport and Laura will be upgraded; and about 50 pad-mounted transformers, 50 switchgears, and all cable splices will be elevated. In Ebeye, the causeway power lines (overhead line hardware is subject to extreme corrosion and foundations are currently under water, making maintenance challenging) will be put underground; and about 15 pad-mounted transformers, 25 switchgears, and all cable splices will be elevated. To enable tree pruning (which reduces power outages), help facilitate maintenance, and accelerate power restoration after natural and climate hazards in both Majuro and Ebeye, three bucket trucks, two crane trucks, two excavators, two cable reel trailers, two mobile test rigs, a forklift and six inspection service vehicles will be provided.

[57]National Renewable Energy Laboratory: *Solar Photovoltaics in Severe Weather: Cost Considerations for Storm Hardening PV Systems for Resilience* and Rocky Mountain Institute: *Solar under storm for Policymakers - Practices for Resilient Photovoltaic Systems for Small Island Developing States.*

21. Component 2: Improved Electricity Access in Outer Atolls (US$12.5 million) will improve the quality of electricity access to enable productive activities in the Arno Atoll (Arno and Ine Islands) and add renewable energy in the generation mix for four other islands (Jaluit, Wotje, Rongrong, and Kili) to reduce operating costs. This component consists of three sub-components:

- ***Sub-component 2.1 – Hybrid mini-grid electrification in Arno and Ine Islands (US$4 million)*** aims to provide higher-level electricity service (instead of SHS-level service) by funding detailed studies, designs, supply, construction, commissioning, and supervision of hybrid mini-grids in Arno and Ine Islands as well as the installation of service drops with prepaid meters and power distribution panels for in-house connection. About 400 kWp of solar PV panels with 1.2 MWh of BESS, inverters, and transformers are expected to be installed to power the mini-grids in Arno and Ine islands. Only two units of 40 kW-diesel generators (about 16 percent of the total installed generation capacity) will be installed to provide backup generation overnight. The construction of mini-grids will support the development of Arno Atoll, the closest atoll to Majuro (9 miles) where the Office of Tourism plans to make it an international tourist destination with expected construction of new hotels. SHS were installed from 2025 to 2018, but over half of the SHS are no longer operational and there is a need for a higher tier level of electricity access (more reliable and enabling productive uses) to meet local and development expectations. Targeted potential customers include about 130 households, one or more resorts and hotels, National Telecommunication Authority's local office, small businesses, two fish bases, two small hospitals, and two public schools.

- ***Sub-component 2.2 – Hybridization of diesel power plants in Jaluit, Wotje, and Rongrong (US$5.5 million)*** will reduce diesel use and associated operating costs by funding detailed studies, designs, supply, installation, commissioning, and supervision of solar PV panels, BESS, inverters, and controls near diesel power plants in Jaluit, Rongrong, and Wotje. 0.7 MW of solar PV capacity and 2.1 MWh of BESS will be installed, which will reduce diesel consumption thereby decreasing operational (fuel) costs and GHG emissions (estimated to be over 20 percent of baseline emissions) as well as lessening the need for GoRMI subsidies (estimated at about US$550,000 every year) and logistic hurdles to transport fuel. The sub-component will also fund some rehabilitation of the distribution networks to enhance the reliability of power supply.

- ***Sub-component 2.3 – Hybridization of the Kili Island's diesel power plant (US$3 million)*** will reduce diesel operating costs and improve reliability and management of power supply by funding detailed studies, designs, supply, installation, commissioning, and supervision of solar PV panels, BESS, inverters, and controls near the diesel power plant in Kili Island as well as upgrade of selected segments of the distribution network, and installation of prepaid meters. Though the majority of the funded activities will be similar to those under sub-component 2.2, sub-component 2.3 is proposed separately as a condition needs to be fulfilled for funding. MEC's service areas do not currently cover Kili Island (as the power infrastructure is under the management of the Local Government), therefore will need to be extended to include Kili. The Local Government is interested in MEC's takeover, and the Cabinet of Ministers are considering an amendment of MEC's service areas. Once the Cabinet issues the amendment, funding will be released for the hybridization of the Kili diesel power plant.

22. Component 3: Institutional Strengthening and Implementation Support (US$4.5 million) aims to strengthen the sector through improved energy efficiency regulations and monitoring of renewable energy targets, as well as increase MEC and KAJUR's capabilities on the design, operation, and maintenance of renewable energy technologies, and resource MEC's PIU adequately to execute the Project. This component consists of three sub-components:

- ***Sub-component 3.1 – Sector Development Assistance (US$1 million)*** will help improve regulations, promote energy efficiency, facilitate adequate uptake of e-mobility, enable renewable energy target monitoring, and facilitate follow-on project development. It will provide international multi-disciplinary expertise to help build regulatory capacity, including cost-reflective electricity tariff review, consultations, and adoption in complementarity with the ADB-funded tariff methodology. It will support energy efficiency regulation (targeting air conditioning temperature control to reduce peak load) and fund energy efficiency & electricity safety campaigns with a focus on islands with new electricity access (Arno and Ine) or significantly improved electricity service (Kili). It will also support the development and adoption of e-mobility policies. To enable monitoring on national renewable energy targets, the subcomponent will develop a renewable energy database and publish a state of renewable energy report, which will record, document, and share critical information on renewable energy, such as installed and available renewable energy capacity, renewable energy produced, and ongoing/planned renewable energy initiatives and projects across the Marshall Islands. The sub-component will also provide funding to carry out prefeasibility studies to identify further renewable energy investments, including floating solar in the lagoon.

- ***Sub-component 3.2 – MEC and KAJUR Capacity Building (US$1 million)*** seeks to enhance the capacity of MEC and KAJUR on design, operation, and maintenance of renewable energy technologies through a combination of international consultant expertise, and gender-sensitive apprenticeship program, internship, and retention policies. It will provide MEC and KAJUR with a renewable energy (solar) expert (engineering level) and an electrical engineer (with experience on distribution networks) who will be based in Majuro and Ebeye for at least two years to train local MEC and KAJUR staff on renewable energy design, operation, and maintenance. It will also support the continuation of the operation & maintenance fund, initiated under SEDeP to enable required replacement/maintenance from fuel cost savings. In collaboration with regional training facilities (through the PPA), a World Bank-financed education project, and the World Bank-implemented Pacific Women in Power program (PWIP), it will fund an apprenticeship pilot—combining on-the-job training with external academic training—for an identified number of MEC and KAJUR staff to develop certified solar technicians, upskilled diesel operators, line technicians, and other required semi-skilled workers. The sub-component will also facilitate internships. The capacity building activities will encourage women involvement in the energy sector by (i) establishing a quota for the number of women included in the apprenticeship and internship intakes, (ii) developing and implementing policies, procedures, and practices, to be identified under the preparation of a gender action plan, to attract and promote the retention of women.

- ***Sub-component 3.3 – Project Implementation Support (IDA: US$2.5 million)*** will provide adequate resources to the MEC's PIU to execute the project. The component will fund consulting and non-consulting services, goods, and operating costs to enable the PIU to manage the project over its duration. This will include salaries of (i) an international project manager (which will be a full-time position for the first two years and later a part-time position), (ii) a local assistant project manager, (iii) a local project implementation officer, (iv) a local procurement officer, (v) a local environment and social development officer, and (vi) a local finance officer. The sub-component will also fund environmental & social risk management activities, citizen engagement activities, geographic information system (GIS)-based monitoring of project realizations, office equipment and supplies, travel/local transport, part-time experts as needed, and training and workshops.

C. Project Beneficiaries

23. Main project beneficiaries include households, businesses, and government facilities in targeted islands as well as MEC, KAJUR, and NEO. Households, businesses, health care centers, community buildings, and government facilities in Arno Atoll, Kili Island, Majuro, and Ebeye will receive enhanced quality or more reliable electricity supply resulting from

the construction of mini-grids (Arno Atoll); rehabilitation of segments of the distribution network (including resilience enhancement of targeted distribution assets) in Majuro and Ebeye; and better managed power infrastructure in Kili Island. Both MEC and KAJUR will benefit from increased revenues (generation fuel cost savings & less power outages) and enhanced operational and project implementation capacity from the integration of renewable energy generation, new maintenance and service equipment, implementation of apprenticeship program, and training and experience on FM, procurement, and safeguards. NEO will benefit from technical assistance and a monitoring tool (renewable energy database).

D. Rationale for Bank Involvement and Role of Partners

24. The project will benefit from the Bank's comprehensive experience on renewable energy, electricity access, and disaster risk management, and inform the design of subsequent phases of the MPA. As outlined in paragraph 12 on development partner support, the World Bank is the major development partner on transition to renewable energy, as the World Bank-financed SEDeP will install 4 MW of rooftop and floating solar PV, whereas all other partners' combined investments have resulted in less than 0.8 MW installed capacity and planned 0.6 MW. In addition, the World Bank has accumulated vast experience and knowledge on scaling up renewable energy integration and expanding electricity access across East Asia, South Asia, Africa, and Caribbean, and will draw on expertise and lessons learned to design and support implementation of the Project. Conversely, it is expected that lessons from the implementation of the project activities will inform the design and implementation support for projects in subsequent phases of the MPA. Specifically, lessons learned from the RMI project are expected to inform the design of the projects in PICs, particularly on issues related to the design of grid strengthening interventions to support RE in low-capacity country contexts. The World Bank is a key partner that could help RMI accelerate the power sector transition to renewable energy and improve the delivery of electricity services. It should also be noted that in Majuro, the Project activities will be complemented by the ADB-financed activities on grid protection systems upgrade and review of MEC tariff methodology.

E. Lessons Learned Reflected in the Project Design

25. The Project design incorporates lessons learned from SEDeP implementation on operational capacity, fiduciary arrangement, and contractor selection. SEDeP implementation faced initial delays due to several reasons, including limited MEC operational capacity, insufficient PIU staffing, ineffective arrangement on procurement and FM support, and late selection of contractors. To avoid these potential implementation bottlenecks under the Project, several activities have been included. The proposed apprenticeship program and acquisition of service vehicles will help MEC enhance its operational capacity by providing certified solar technicians, line technicians, and required vehicles and equipment that will facilitate project-related work. MEC's PIU will be provided with additional staff—a renewable energy solar expert, electrical distribution engineer, and three fiduciary staff. In addition, the Project's improved fiduciary arrangement (with MEC's PIU having full fiduciary responsibility) will reduce timeframes for payments and contract effectiveness and provide clearer accountability on performance. To enable faster selection of contractors to install solar PV systems and construct mini-grids, MEC is preparing terms of reference to select consultant firms that will prepare bidding documents for the selection of contractors for the installation of solar PV systems and construction of mini-grids.

26. 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, that were developed for PICs under the World Bank-financed regional project (Sustainable Energy Industry Development Project). In addition, the Project supports the replenishment of the operational and maintenance fund (from fuel cost savings) and will provide MEC with certified solar PV technicians that will ensure adequate maintenance.

III. IMPLEMENTATION ARRANGEMENTS

A. Institutional and Implementation Arrangements

27. MEC will be the project implementation entity and responsible for all fiduciary aspects. MEC has gained significant experience on implementing donor-funded projects, including the World Bank-financed SEDeP project and the ADB-funded technical assistance project. MEC has a dedicated PIU which has been implementing the SEDeP project with an overall moderately satisfactory performance. Under SEDeP, support on FM, procurement, and safeguards has been provided by the CIU hosted within the MFBPS/ DIDA. SEDeP's fiduciary support arrangement does not enable clear accountability and has led to mismatch in expectations and suboptimal performance on FM and procurement. As MEC's FM systems meet World Bank requirements and given the need to improve SEDeP's fiduciary support arrangement, MFBPS recently communicated that MEC will be now responsible for all fiduciary aspects including FM, disbursement, procurement, and safeguards. Thus, the current staffing of the MEC PIU will be retained under the Project and will be strengthened by hiring, not later than three months after effectiveness, a finance officer, a procurement officer, and an environmental and social development officer. Nonetheless, MEC's PIU staff will continue to receive environmental and social oversight support from the CIU's international safeguards advisors. MEC will implement the Project in accordance with a project implementation manual that details institutional, FM, disbursement, procurement, environmental & social arrangements and procedures for day-to-day execution. The adoption of the manual is an effectiveness condition of the Project. To improve readiness, the project implementation manual was drafted by the PIU and reviewed by the Bank. The SEDeP Project Manager will transition to the Project, and terms of reference are available to start the selection of both the finance officer and the procurement officer. Also, terms of reference were drafted to initiate the selection of engineering consulting firms that will draft bidding documents and request for proposals from contractors for the supply and installation/construction of solar PV systems and mini-grids.

28. To enable higher level coordination and strategic guidance, MEC's PIU will report to a Project Steering Committee (PSC), already operational. The PSC was set up under SEDeP and has been a relevant platform for higher level coordination and guidance. The PSC is chaired by the Chief Secretary of the Government of RMI or her/his designee and comprises representatives from MFBPS/DIDA, Ministry of Works, Infrastructure and Utilities, CUB, KADA, NEO, MEC, KAJUR, and Majuro Water and Sewerage Company. As the Project funds activities in outer islands (unlike SEDeP), the composition of the PSC will be enhanced to include key representatives from Jaluit, Wotje, Arno atoll, and Kili Island.

29. IDA financing will flow to a MEC-managed designated account (DA) and be disbursed mainly through direct payments. The MFBPS, as the recipient of World Bank financing, will make available the financing proceeds to MEC, through a subsidiary agreement. The proceeds will be deposited in a DA, opened, and managed by MEC. MEC's PIU will use the proceeds from the DA to cover some expenses, including operation expenditures (such as PIU staff/consultant salaries, office supplies, travels, communication, and citizen engagement workshops) and other eligible expenditures. The DA will be replenished using withdrawal applications. Other disbursement methods include reimbursement, advance (into the DA), and special commitments. As most of the financing will fund major contracts for solar PV systems supply and installation, mini-grid construction, and network rehabilitation, over two thirds of the IDA financing will be disbursed through direct payments from the World Bank to contractors, goods suppliers, and engineering supervisory firms.

B. Results Monitoring and Evaluation Arrangements

30. MEC will be responsible for monitoring and evaluating progress and results with support from contractors and engineering supervisory firms. MEC's management and PIU will be assisted by engineering supervisory firms (owner's engineers) to monitor and assess implementation progress, including advancement on designs, supplies of goods/equipment, works, and installation by contractors. To facilitate monitoring in outer islands, the Project will fund

the acquisition of a GIS-based monitoring platform such as Kobo Tool, and train key PIU staff, the owner's engineer, contractors, and NEO to map out and document realizations. Based on assessed progress, MEC's PIU will update the project results framework and send to the World Bank, progress reports including a semestrial project report covering all project aspects. The results framework's indicator data on outer islands will be improved through data collection as part of detailed feasibility studies started during project preparation. 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 objectives 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. Sustainability

31. The sustainability of the Project is underpinned by the strong commitment of both the GoRMI and MEC to the project objectives. As indicated above, the Project will help the GoRMI move towards achievement of its NDC targets and will implement parts of the investment needs presented in the 2018 Electricity Roadmap. More recently, the new Administration has put an emphasis on the energy sector, and the President, at his January 2024 inauguration speech, highlighted the need for reliable power supply and transition to renewables, which are key areas of focus of the Project. MEC has also embraced the transition to renewable energy and revised its mission statement to explicitly include a focus to renewable energy generation. Moving forward, integration of renewables in the generation mix is part of MEC's priority investment plan, from which some key activities were drawn for financing under the Project. The alignment of the Project's objectives and key activities with MEC's investment plan and the GoRMI's goals, enable sustained efforts beyond the project timeframe.

32. The Project addresses key sustainability factors, such as MEC's financial viability, operation and maintenance fund, and in-house capacity. MEC's financial viability is expected to improve from both (i) the operation of project-funded renewable energy generation which will reduce MEC's operational costs, and (ii) the project support on tariffs, which will contribute to the adoption of cost-reflective tariffs. More funding will be available for adequate after-project maintenance of the installed solar PV systems, as the SEDeP-initiated operation and maintenance fund will receive additional funding from part of the fuel cost savings. Furthermore, MEC's operational capacity will be enhanced through the Project's apprenticeship program, which will provide certified technicians able to perform adequate maintenance of acquired/upgraded power infrastructure.

IV. PROJECT APPRAISAL SUMMARY

A. Technical, Economic and Financial Analysis

33. *Technical Appraisal*: Solar PV systems is the renewable energy technology selected for this project because of higher experience of exposure and familiarity in RMI (better established), cost-efficiency, and resource availability across RMI. Wind technology was considered but more data in various locations and studies will be needed for its deployment. The choice of solar PV systems is well aligned with the Electricity Roadmap which highlights solar PV as the first choice in the first phase of RMI's energy transition journey. Procured Solar PV systems will comply with the relevant International Electrotechnical Commission and Underwriters Laboratory standards. The solar PV systems will be designed and installed in accordance with the USA National Electrical Code and the guidelines developed by the PPA and the Sustainable Energy Industry Association of the Pacific Islands. To strengthen resilience to storms, the solar PV systems will be installed following good practices drawn from internationally recognized publications 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." Costing of the Project activities is based on unit costs from awarded contracts under SEDeP taking into consideration inflation and taxes.

34. ***Paris alignment*: 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 (including energy storage), rehabilitation of selected grid segments and distribution lines, technical assistance, and capacity building to support renewable energy generation and energy efficiency 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. Activities related to the construction of hybrid mini-grids supported by installation of two units of diesel generators are low risk and aligned. In particular, in Ano and Ine islands, the project installation of 80 kW of diesel generation will lead to negligible emissions (low risk) and will ensure reliable supply of electricity generated mostly from the solar PV systems (400 kWp and 1.2 MWh of battery storage). Furthermore, (i) renewable energy generation units are well maintained, and diesel generators are used only when the amount of renewable energy generated and stored cannot fully meet demand and (ii) fossil fuel generation is less costly than installing sufficient battery storage to meet the same demand. Activities related to provision of critical/emergency operational vehicles and equipment are also low risk and aligned as they are diesel vehicles/operated which are relatively short lived, do not provide barrier to future fleet improvements, and lower carbon alternatives were not feasible in this context. 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 after integration of resilience measures. As some targeted islands are low-lying islands, the infrastructure to be installed could be exposed to tidal/coastal flooding, strong winds, and storms. To reduce the risk, the Project incorporates resilience/adaptation measures in the design such as (i) elevating pad-mounted transformers and switchgears above surrounding levels, (ii) replacing underground cable splices by elevated sectionalizing cabinets, (iii) undergrounding the Ebeye's causeway distribution line (whose foundations are currently under water, making maintenance challenging), (iv) enhancing the capacity of the power utilities to maintain the systems, (v) provision of buck trucks and other emergency service vehicles for faster restoration/recovery after hazard events, and (vi) sensitization campaigns for local communities to enable safe and efficient use of electricity. The solar PV and installation will also comply with hurricane/storm resilient standards and practices informed by internationally recognized publications. These measures reduce the residual risk to the Project to low, and risks from climate hazards are considered as acceptable.

35. ***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 design and construction of critical assets, (c) providing technical assistance and studies to improve the enabling climate change-related framework, and (d) providing capacity building for RE scale-up. Climate mitigation co-benefits will result from activities under (i) Subcomponent 1.1. through the installation and integration of new solar PVs and BESS to the Majuro and Ebeye grids; (ii) Subcomponent 1.2. through the grid strengthening and rehabilitation of selected feeders required to enable the transport of additional renewable electricity; (iii) Subcomponent 2.1. through the installation of hybrid mini-grid with about 80 percent of renewable energy in the total installed capacity; and (iv) Subcomponents 2.2. and 2.3. by converting existing diesel-only mini-grids in Jaluit, Wotje, Rongrong, and Kili islands into hybrid systems with solar PV and battery energy storage where funds will be used exclusively for solar PV and BESS. In addition, sector development assistance activities under Component 3 will contribute to renewable energy scale up by providing technical assistance for improving regulations, enabling renewable energy target monitoring, and providing

capacity building for the operation, and maintenance of renewable energy technologies. The Project will contribute to the climate adaptation co-benefits as climate resilience measures will be incorporated into design and construction of all activities in Components 1 and 2. The design and installation of solar PV systems and mini-grids as well as the elevated distribution assets will comply with hurricane and storm resilient standards and practices. Also, critical vehicles will be provided to accelerate recovery after natural or climate hazards. More details can be found in the Components description section.

36. ***Economic Analysis*****: An economic analysis was carried out and shows that the Project is economically viable**. The methodology follows the World Bank's 'Guideline for Power Sector Investment Projects Economic Analysis' and derives the Economic Net Present Value (ENPV) and Economic Internal Rate of Return (EIRR) by comparing cases with and without the Project. The main Project benefits are: (i) reduction in generation costs through fuel savings from added renewable energy generation, (ii) reduction in power outages (SAIDI), (iii) avoided loss in electricity supplied through network upgrade, and (iv) improved electricity access in outer islands. The Project will reduce generation costs by US$5.2 million annually, technical losses by 566 MWh annually and unserved energy by 689 MWh annually. Due to the limited new customers connected to the grids in outer islands, the avoided cost for self-generation by households, commercial and public facilities, is very minimal. The Project will contribute to avoiding carbon emissions by 12,300 metric tons of CO_2 equivalent (tCO_2e) annually and approximately 0.25 $MtCO_2$ over the lifetime of the asset (20 years), including both the avoided emissions from RE generation and reduced technical losses. The analysis shows that the Project yields economic returns and GHG mitigation benefits. The project's EIRR is 10.41 percent, higher than the hurdle rate or social discount rate of five percent, and the ENPV is approximately US$18.66 million. With environmental benefits, the EIRR rises to 12.76 percent and ENPV to US$27.94 million with low carbon price values adopted.

37. ***Financial Analysis*****: A financial analysis was undertaken from the perspective of the power utilities and indicates that the Project will contribute to improving the financial viability of the utilities**. The analysis follows World Bank guidance conducted for Components 1 and 2, the main components supporting infrastructure investments. It could not cover Component 3: Institutional Strengthening and Implementation because this component is not yet defined in detail and some of the activities are studies, thus harder to quantify. A cash flow analysis for Component 1 and 2 considered expenses and revenues that directly affect financial cash flows. Power utilities will generate additional revenues from fuel cost savings, electricity sales to new customers, avoided technical losses, and reduced unserved energy. As the Project is fully financed by an IDA grant, the cost of the grant was assumed to be the cost of equity of the GoRMI. There is no Weighted Average Cost of Capital (WACC) ratio available. The financial analysis used an estimated discount rate of about five percent. The result shows that the Project is financially viable with a positive Financial Net Present Value (FNPV) of approximately US$6 million and a positive Financial Internal Rate of Return (FIRR) of 18.80 percent.

B. Fiduciary

38. ***Financial Management*****: A FM assessment[58] was carried out in accordance with the Principles Based Financial Management Practice Manual issued by the World Bank on February 4, 2014, and as further elaborated in the World Bank Guidance Financial Management Manual for World Bank Investment Project Financing Operations effective March 1, 2010, and revised on September 7, 2021**. Under WB IPF guidelines with respect to projects financed by the World Bank, the borrower and the project implementing agencies are required to maintain satisfactory 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. Overall, the proposed Project's FM arrangements meet the minimum requirements of the World Bank. MEC's SEDeP PIU will transition as Project PIU and will be staffed with a finance officer to carry out the FM

[58] The FM assessments were conducted in October 2023 and March 2024.

and disbursement functions for the Project including budget preparation and monitoring, performing the accounting, financial reporting, internal controls, and external audit arrangements. The World Bank FM team will provide fiduciary guidance, support and training to the PIU. The PIU will adopt a comprehensive project implementation manual which includes the arrangements and procedures for (a) the institutional arrangements for day-to-day execution of the Project including budgeting, disbursement, and 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 will monitor the FM aspects of the Project through implementation support missions that will include reviewing interim unaudited financial reports and supporting documentation, verifying the effectiveness of internal control mechanisms, and following up on the status of issues raised during implementation and in audit reports. The Project FM risk is rated as Substantial.

39. ***Procurement*****: A procurement assessment[59] was carried out and project procurement will follow the World Bank Procurement Regulations for IPF Borrowers (September 2023)**. The Project will be subject to the World Bank's Anti-Corruption Guidelines, as of July 1, 2016, and Mandatory enhanced measures for procurement of solar panels/components in IPF projects where solar is a "core" component. The Project will use the Systematic Tracking of Exchanges in Procurement (STEP) system to plan, record, and track procurement activities. The procurement under the Project is expected to be (a) individual consultants, (b) consulting services (technical assistance and consulting services to support the project implementation, design, and supervision of works), and (c) engineering, procurement, and construction (EPC) construction/rehabilitation/installation works. MEC's PIU prepared the first 18-month procurement plan and the Project Procurement Strategy for Development (PPSD). The PPSD describes the overall operational context and activities, market situations, procurement methods, and possible procurement risks. MEC has some experience with World Bank-financed projects while KAJUR has limited experience from the existing SEDeP project. Key risks are (i) limited procurement staffing and capacity of MEC's PIU, (ii) insufficient experience of MEC in administering a higher number of contracts with some covering remote islands; (iii) limited market capacity and access to sites; and (iv) delayed progress in selecting engineering firms for preliminary concept designs and bidding document preparation for contractor selection. To mitigate the risks, the SEDeP Project Manager will transition as Project Manager, a procurement officer will be added to the PIU, and internationally recruited supervision engineering firms will provide procurement assistance (technical evaluation of bids, support on contract negotiation, and contract management). In addition, the Bank team will support MEC PIU in preparing bidding documents for major works to ensure key contract signatures and adequate disbursement the first year of implementation.

C. Legal Operational Policies

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

D. Environmental and Social

40. The environmental and social risks have been assessed as Moderate for the Project, given that it is not large or complex, and that potential environmental and social risks and impacts are not expected to be significant. Potential risks and impacts relate to occupational health and safety (OHS) associated with civil works, community health and safety risks

[59] Procurement assessments were conducted in October 2023 and March 2024.

particularly where civil works take place in the areas of public or community spaces including potential exposure to live electricity wires, sourcing of aggregate for activities related to enhancing the resilience of existing distribution networks, waste management, equality across households in accessing projects benefits, and risks related to Sexual Exploitation and Abuse (SEA) and Sexual Harassment (SH). Some activities will take place in the neighbouring islands of Arno, Wotje, Jaluit and Rongrong which are more challenging to access in terms of construction and supervision. Risks and impacts are easily mitigated through conventional environmental and social risk management strategies, as outlined in the Environmental and Social Management Plan (ESMP) (which includes a Labor Management Procedure (LMP)), and Social Engagement Plan (SEP). Land access for the installation of solar equipment will be required, but there will be no requirement for land acquisition as public land will be prioritized and voluntary lease arrangements will be sought for all other land. A Land Access Plan will be prepared during implementation to guide how land will be accessed for Project activities. Stakeholder engagement will be undertaken to ensure that local impacts are identified and understood, and that any gaps to inclusion in participating in project benefits are managed and impacts related to inability to pay for enhanced electricity services for any vulnerable groups. In accordance with the ESMP, contractors will prepare Contractor ESMP (CESMP). The CESMP will, among other key aspects, describe and implement chance finds procedures for cultural heritage items and any other items, including unexploded ordnances, which are highly unlikely in RMI due to the disturbed nature of the habitats but considered as a precautionary measure. In the unlikely event that an unexploded ordnance is encountered on any worksite associated with the Project, the Recipient will follow the procedures and requirements outlined in (i) the applicable laws and regulations and (ii) the ESMP. The Appraisal ESRS, ESCP and SEP were disclosed on April 19, 2024. The ESMP was disclosed in the country on April 8, 2024, and on the World Bank's website on May 27, 2024.

41. There are allegations of forced labor risks associated with the polysilicon (a key input for solar panels production) suppliers. MEC 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, MEC 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, MEC will require the primary supplier to identify those risks and if forced labor cases are identified, MEC will require the primary supplier to take appropriate steps to remedy them. Ultimately, where remedy is not possible, MEC 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, MEC 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.

E. Maximizing Finance for Development

42. Aligned with the strong focus of the MPA on facilitating private sector financing, the Project will foster a more conducive regulatory and institutional framework for private investments. The project subcomponent 3.1 will provide technical assistance to inform the design and implementation of key power sector regulations, including licenses and concessions, that will enable increased private sector involvement in the power sector. In addition, the project subcomponent 1.2 financing will be targeted at rehabilitating feeders/transmission lines in both Majuro and Ebeye grids, which will augment power transmission/transfer capacity, thereby reducing key bottlenecks to the evacuation of private-led power generation. Finally, the project investments on renewable energy generation will significantly reduce power generation costs, which will improve MEC's financial health and thereby, enhance its position as a creditworthy counterpart in power purchase agreements with private developers.

F. Gender

43. The Project will support the design and implementation of a gender action plan, which is expected to result in a seven percent increase of women in technical or leadership positions in the power sector, thereby contributing to reduce disparities. Recent MEC data collected by the World Bank's Pacific Women in Power Program (PWIP, P179022) reveals that female employees only make up 8.3 percent of MEC workforce and all (157) technical and engineering staff are male. Very limited programs and initiatives are focused on promoting women's employment in the sector. For example[60], in 2023, all apprentices and technical internships were granted to men. MEC senior management has been shown commitment to significantly reduce gender gaps in women's employment. The project will develop and implement a gender action plan for MEC and KAJUR under the Component 3.2. Specific interventions will involve (i) apprenticeship program with targets for women; (ii) training programs for staff, human resources, and legal teams (for example, unconscious bias, leadership, violence against women and girls, best practice for hiring policies and practices); and (iii) outreach initiatives, procurement policies and targets promoting women employment by private contractors that will carry out works and installation. Technical assistance will be provided by the PWIP program implemented by the World Bank's Social Inclusion and Energy Practices until December 2026, including coordination with PPA. Detailed progress will be measured against the comprehensive PWIP baseline survey and published by PPA. Project level progress will be captured in the results framework, which includes an indicator on the increased share of women in technical, engineering, and/or management positions. Besides, the PWIP-supported gender interventions, the Project will install street lighting in Arno atoll, which will contribute to reduce gender-based violence.

G. Citizen Engagement

44. The Project will enable citizen engagement with local institutions, communities, and electricity customers, throughout the project life cycle. During project preparation, MEC and KAJUR have held consultations with landowners, school and church representatives, mayor and council members of Majuro, Ebeye, and Kili Island, and secured commitment letters for some sites where solar PV panels will be installed on facility rooftops and available lands. Further consultations will be undertaken over project implementation, where citizens will be involved in several activities including (a) information sessions on procurement, construction and installation timelines, (ii) information sessions on electricity connection requirements, in-house wiring, and prepaid meters in Arno and Ine Islands, (iii) sensitization campaigns on efficient use of electricity and electricity safety, (iv) GRM, and (v) beneficiary surveys. Feedback from participants will be documented and used to improve subsequent outreach activities. A Citizen Engagement indicator has been incorporated in the Results Framework: *beneficiaries satisfied with outreach activities (percentage)*.

V. GRIEVANCE REDRESS SERVICES

45. Communities and individuals who believe they are adversely affected by a project supported by the World Bank may submit complaints through existing project-level grievance mechanisms or the World Bank's Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed in order to address project-related concerns. Project affected communities and individuals may submit their complaint to the Bank's independent 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 World

[60] All data and findings are from the Pacific Women in Power (PWIP, P179022) program baseline survey. Data was completed December 2023 for MEC and February 2024 NEO. KAJUR data are not available.

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*

VI. KEY RISKS

46. The overall project risk is assessed as Substantial mainly because of limited institutional capacity for implementation and sustainability and MEC's limited familiarity with World Bank's fiduciary functions. Other risks were assessed as moderate or low. The following two risks, whose likelihood and impact could substantially affect achievement of the PDO, are presented below.

47. Institutional capacity for implementation and sustainability (Substantial): As indicated in the sectoral context, MEC has very few engineers, lacks certified technicians on solar PV and diesel plant operation, and possesses limited machinery for works and transportation means to outer islands. MEC also has limited funding for operation and maintenance. These risks will constraint MEC's ability to deliver timely support or facilitate implementation and ensure adequate maintenance after project closing. To address the capacity constraints, MEC committed to hiring new engineers and technicians who, together with designated current staff, will be trained under the project-funded apprenticeship program. The program is expected to lead to the certification of some MEC's staff on solar PV system maintenance, which would provide in-house capacity for after-project maintenance. In addition, the Project will equip MEC with critical machinery and vehicles, which will facilitate operations, project-funded works, and prompt recovery after climate/natural hazards. The Project will support the replenishment of MEC's Operations and Maintenance (O&M) fund to provide funding for equipment replacement.

48. Fiduciary (FM and Procurement) (Substantial): Though MEC has a dedicated finance department (with well-working FM systems) that managed ADB-financed projects, its PIU for World Bank projects has not yet directly managed World Bank financing, as FM was primarily handled by the CIU. Thus, MEC's PIU lacks staffing in finance. On procurement, though MEC's PIU led the procurement under SEDeP and acquired considerable procurement experience, this Project has a higher geographic span with interventions in outer islands. Thus, higher procurement capacity would be required under the Project. To address the limited fiduciary capacity, mitigation measures were included as part of the Project. Five new consultant positions will be funded—an accountant, a solar expert, an electrical engineer, a procurement officer, and an environment and social officer within MEC's PIU, whose current staff are expected to retain their positions. In addition, the PIU will also be supported by experienced engineering supervisory consulting firms (owner's engineer) that will do preliminary designs, prepare bidding documents, assist the PIU (on technical evaluation of bids, negotiation of contracts) in the selection of contractors and supervise works/installation till commissioning.

VII. RESULTS FRAMEWORK AND MONITORING

PDO Indicators by PDO Outcomes

Baseline	Period 1	Period 2	Period 3	Period 4	Period 5	Closing Period
Renewable energy generation in targeted main and outer islands						
Renewable energy capacity enabled with direct support, indirect support, and/or enabling policy support (Megawatt)						
Sep/2024	Sep/2025	Sep/2026	Sep/2027	Sep/2028	Sep/2029	Sep/2030
0	0	0	1.2	2.9	6.6	8
Improve the reliability and quality of electricity service in targeted main and outer islands						
Reduction of unplanned power outages in the distribution network of Majuro (Percentage)						
Sep/2024	Sep/2025	Sep/2026	Sep/2027	Sep/2028	Sep/2029	Sep/2030
0	0	0	5	10	20	25
Reduction of unplanned power outages in the distribution network of Ebeye (Percentage)						
Sep/2024	Sep/2025	Sep/2026	Sep/2027	Sep/2028	Sep/2029	Sep/2030
0	0	0	5	10	20	25
People provided with new or improved access to electricity (Number)						
Sep/2024	Sep/2025	Sep/2026	Sep/2027	Sep/2028	Sep/2029	Sep/2030
0	0	6,000	10,000	12,500	20,000	25000

Intermediate Indicators by Components

Baseline	Period 1	Period 2	Period 3	Period 4	Period 5	Closing Period
Component 1: Renewable Energy and Network Upgrade						
Installed capacity of solar PV systems in Majuro and Ebeye (Megawatt)						
Sep/2024	Sep/2025	Sep/2026	Sep/2027	Sep/2028	Sep/2029	Sep/2030
0	0	0	0.9	2.5	5.5	6.6
Increased capacity of battery energy storage in Majuro and Ebeye (Megawatt hour)						
Sep/2024	Sep/2025	Sep/2026	Sep/2027	Sep/2028	Sep/2029	Sep/2030

0	0	0	4.0	9.0	9.0	11
Customers (households, businesses, community facilities, and government facilities) benefitting from reduced number of hours of power outages in Majuro and Ebeye (Number)						
Sep/2024	Sep/2025	Sep/2026	Sep/2027	Sep/2028	Sep/2029	Sep/2030
0	0	1,300	3,300	4,000	4,500	5,000
Improved power distribution assets for better adaptation to extreme weather events and climate change (pad-mounted transformers, switchgear, sectionalizing unit, joints replaced) in Majuro and Ebeye (Number)						
Sep/2024	Sep/2025	Sep/2026	Sep/2027	Sep/2028	Sep/2029	Sep/2030
0	0	10	20	30	40	50
New emergency service vehicles operational for better vegetation management and more efficient disaster restoration at both MEC and Ebeye (Number)						
Sep/2024	Sep/2025	Sep/2026	Sep/2027	Sep/2028	Sep/2029	Sep/2030
0	0	7	14	14	14	14
Projected lifetime net Greenhouse Gas (GHG) emissions reduction from results achieved (tCO2eq)						
Sep/2024	Sep/2025	Sep/2026	Sep/2027	Sep/2028	Sep/2029	Sep/2030
0	0	0	25000	60000	130000	250000
Component 2: Improved Electricity Access in Outer Atolls						
Installed capacity of solar PV systems in outer atolls (Megawatt)						
Sep/2024	Sep/2025	Sep/2026	Sep/2027	Sep/2028	Sep/2029	Sep/2030
0	0	0	0.3	1	1.4	1.4
Increased capacity of battery energy storage in outer atolls (Megawatt hour)						
Sep/2024	Sep/2025	Sep/2026	Sep/2027	Sep/2028	Sep/2029	Sep/2030
0	0	0	0.9	2.1	3.3	4.2
Households, businesses, community facilities, and government facilities connected to mini hybrid grids in Arno atoll (Number)						
Sep/2024	Sep/2025	Sep/2026	Sep/2027	Sep/2028	Sep/2029	Sep/2030
0	0	0	40	40	80	140
Customers (households, businesses, community facilities, and government facilities) benefitting from reduced number of hours of power outages in selected outer atolls (Number)						
Sep/2024	Sep/2025	Sep/2026	Sep/2027	Sep/2028	Sep/2029	Sep/2030
0	0	0	20	100	120	150
Component 3: Institutional Strengthening and Implementation Support						
Report on renewable energy status published using the database (Yes/No)						
Sep/2024	Sep/2025	Sep/2026	Sep/2027	Sep/2028	Sep/2029	Sep/2030
No	No	No	Yes	Yes	Yes	Yes
Electricity tariff methodology adopted (Yes/No)						
Sep/2024	Sep/2025	Sep/2026	Sep/2027	Sep/2028	Sep/2029	Sep/2030
No	No	No	Yes	Yes	Yes	Yes

Certified solar technicians, linemen, plant operators out of participants in certification programs (Percentage)						
Sep/2024	Sep/2025	Sep/2026	Sep/2027	Sep/2028	Sep/2029	Sep/2030
0	0	0	10	30	50	80
Certified solar technicians, linemen, plant operators – of which female (Percentage)						
Sep/2024	Sep/2025	Sep/2026	Sep/2027	Sep/2028	Sep/2029	Sep/2030
0	0	0	0	5	8	10
Gender action plan activities implemented (Percentage)						
Sep/2024	Sep/2025	Sep/2026	Sep/2027	Sep/2028	Sep/2029	Sep/2030
0	0	10	25	50	60	75
Increased share of women in technical, engineering, and/or management positions (Percentage)						
Sep/2024	Sep/2025	Sep/2026	Sep/2027	Sep/2028	Sep/2029	Sep/2030
0	0	0	0	3	5	7
Beneficiaries satisfied with outreach activities (Percentage)						
Sep/2024	Sep/2025	Sep/2026	Sep/2027	Sep/2028	Sep/2029	Sep/2030
0	0	0	50	60	65	75