Project Number: 49450-021
August 2020

Pacific Renewable Energy Investment Facility
Kiribati: South Tarawa Renewable Energy Project

Asian Development Bank

CURRENCY EQUIVALENTS

(as of 3 August 2020)

Currency units	–	Australian dollar/s (A$)
A$1.00	=	$0.69
$1.00	=	A$1.40

ABBREVIATIONS

ADB	–	Asian Development Bank
BESS	–	battery energy storage system
CO_2e	–	carbon dioxide equivalent
DMC	–	developing member country
GDP	–	gross domestic product
KIER	–	Kiribati Integrated Energy Roadmap
kW	–	kilowatt
kWp	–	kilowatt-peak
MW	–	megawatt
MWh	–	megawatt-hour
PAM	–	project administration manual
MFED	–	Ministry of Finance and Economic Development
MISE	–	Ministry of Infrastructure and Sustainable Energy
TA	–	technical assistance
PUB	–	Public Utilities Board

NOTE

In this report, "$" refers to United States dollars, unless otherwise stated.

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PROJECT AT A GLANCE

1. Basic Data — **Project Number:** 49450-021

Project Name	South Tarawa Renewable Energy Project	**Department/Division**	PARD/PAEN
Country	Kiribati	**Executing Agency**	Asian Development Bank
Recipient	Government of Kiribati		
Country Economic Indicators	https://www.adb.org/Documents/LinkedDocs/?id=49450-021-CEI		
Portfolio at a Glance	https://www.adb.org/Documents/LinkedDocs/?id=49450-021-PortAtaGlance		

2. Sector	**Subsector(s)**	**ADB Financing ($ million)**
✓ **Energy**	Energy sector development and institutional reform	0.20
	Renewable energy generation - solar	7.80
	Total	**8.00**

3. Operational Priorities

- ✓ Addressing remaining poverty and reducing inequalities
- ✓ Accelerating progress in gender equality
- ✓ Tackling climate change, building climate and disaster resilience, and enhancing environmental sustainability
- ✓ Strengthening governance and institutional capacity

Climate Change Information

GHG reductions (tons per annum)	6,900
Climate Change impact on the Project	Medium
ADB Financing	
Adaptation ($ million)	0.20
Mitigation ($ million)	4.80
Cofinancing	
Adaptation ($ million)	0.20
Mitigation ($ million)	3.50

Sustainable Development Goals

SDG 1.4, 1.5
SDG 5.5
SDG 7.2
SDG 10.3
SDG 13.a

Gender Equity and Mainstreaming

Effective gender mainstreaming (EGM) ✓

Poverty Targeting

General Intervention on Poverty ✓

4. Risk Categorization: Low

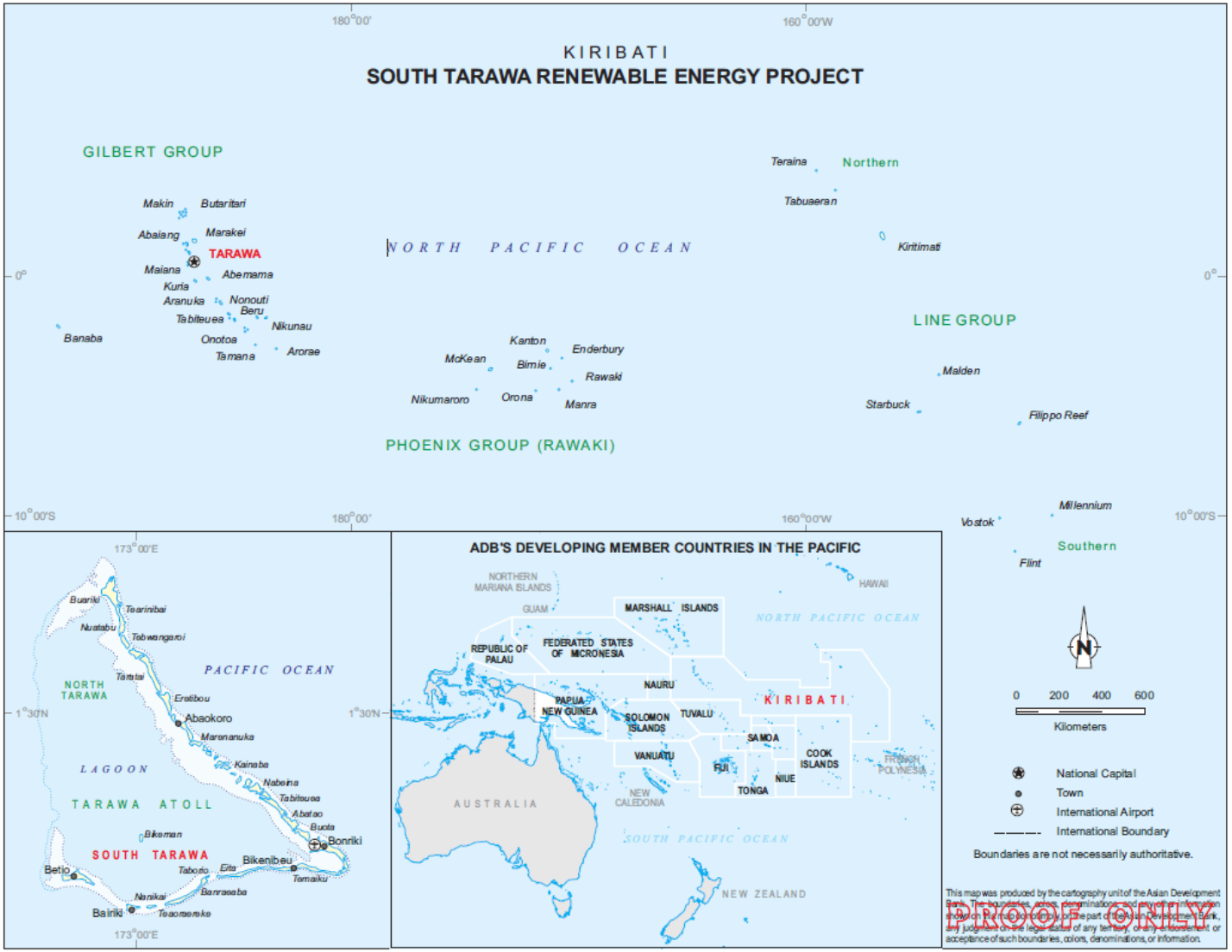
5. Safeguard Categorization **Environment:** B **Involuntary Resettlement:** B **Indigenous Peoples:** C

6. Financing

Modality and Sources	Amount ($ million)
ADB	**8.00**
Sovereign Project grant: Asian Development Fund	8.00
Cofinancing	**5.70**
Government of New Zealand - Project grant (Full ADB Administration)	2.00
Strategic Climate Fund - SREP - Project grant (Full ADB Administration)	3.70
Counterpart	**1.00**
Government	1.00
Total	**14.70**

Currency of ADB Financing: US Dollar

MAP


KIRIBATI
SOUTH TARAWA RENEWABLE ENERGY PROJECT
GILBERT GROUP
Makin
Butaritari
Abaiang
Marakei
TARAWA
Maiana
Abemama
Kuria
Aranuka
Nonouti
Beru
Tabiteuea
Nikunau
Onotoa
Tamana
Arorae
Banaba
NORTH PACIFIC OCEAN
Teraina
Northern
Tabuaeran
Kiritimati
LINE GROUP
Kanton
Enderbury
McKean
Birnie
Rawaki
Nikumaroro
Orona
Manra
Malden
Starbuck
Filippo Reef
PHOENIX GROUP (RAWAKI)
Vostok
Millennium
Southern
Flint
180°00'
160°00'W
0°
10°00'S
173°00'E
1°30'N
PACIFIC OCEAN
NORTH TARAWA
LAGOON
TARAWA ATOLL
SOUTH TARAWA
Buariki
Tearinibai
Nuatabu
Tabwangaroi
Tanitai
Eratibou
Abaokoro
Marenanuka
Kainaba
Nabeina
Tabiteuea
Abatao
Buota
Bonriki
Bikeman
Betio
Taboio
Eita
Bikenibeu
Tomaiku
Nanikai
Banraeaba
Bairiki
Teaomeneke
ADB'S DEVELOPING MEMBER COUNTRIES IN THE PACIFIC
NORTHERN MARIANA ISLANDS
GUAM
HAWAII
MARSHALL ISLANDS
NORTH PACIFIC OCEAN
REPUBLIC OF PALAU
FEDERATED STATES OF MICRONESIA
NAURU
PAPUA NEW GUINEA
KIRIBATI
SOLOMON ISLANDS
TUVALU
SAMOA
VANUATU
FIJI
COOK ISLANDS
NIUE
TONGA
FRENCH POLYNESIA
NEW CALEDONIA
AUSTRALIA
SOUTH PACIFIC OCEAN
NEW ZEALAND
0 200 400 600
Kilometers
National Capital
Town
International Airport
International Boundary
Boundaries are not necessarily authoritative.
This map was produced by the cartography unit of the Asian Development Bank. The boundaries, colors, denominations and any other information shown on this map do not imply, on the part of the Asian Development Bank, any judgment on the legal status of any territory, or any endorsement or acceptance of such boundaries, colors, denominations, or information.
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I. BACKGROUND

1. On 22 June 2017, the Board of Directors of the Asian Development Bank (ADB) approved the Pacific Renewable Energy Investment Facility (facility).[1] The facility finances renewable energy projects in the 11 smaller Pacific island developing member countries (PIC-11).[2] It has an overall estimated cost of $750 million, including ADB financing of up to $200 million. Upon approval, the Board delegated authority to the President to approve loans and/or grants to each targeted country for qualifying projects.

2. The facility will finance a grant to Kiribati for the South Tarawa Renewable Energy Project, which will be cofinanced by grants from the Strategic Climate Fund[3] and from the Government of New Zealand, both to be administered by ADB. Through installation of solar and battery energy systems, and creation of inclusive enabling regulatory frameworks, the project will help the Government of Kiribati expand access to clean energy; improve the quality, reliability, and climate resilience of service; reduce reliance on fossil fuels for power generation; reduce greenhouse gas emissions; and reduce the cost of generation. The project will decrease the cost of supply by partially replacing diesel power with solar power.

II. THE PROJECT

A. Rationale

3. **Country context.** The Republic of Kiribati is a small island nation in Central Pacific. It comprises 32 atolls and a coral island with a total land area of 810 square kilometers (km^2) widely dispersed over an exclusive economic zone of 3.5 million km^2 and spread across three island groups and time zones. Kiribati's remoteness from major markets and most resources leads to high import costs, while its low elevation - averaging only 2 meters above sea level - creates severe vulnerability to sea-level rise and other climate change impacts and natural hazards. Like many other small Pacific islands, Kiribati's electricity generation relies heavily on imported diesel fuel, transported over long distances across the ocean and subject to weather and climate-change related supply disruptions.[4] This dependence exposes Kiribati to fluctuating oil prices and has resulted in one of the region's highest costs of power generation.[5] The Government of Kiribati has prioritized strengthening fuel security and reducing carbon emissions and hopes that continued investments in renewable energy, energy storage, and distributed technologies improve the country's energy security and increase grid reliability, while reducing fossil fuel consumption.

4. **Sector context.** Grid-connected electricity in Kiribati's capital, South Tarawa, is generated and distributed by the Public Utilities Board (PUB), a state-owned electricity and water utility. PUB's installed capacity of 7.01 megawatts (MW) comprises several diesel generators totalling 5.45 MW and recently completed grid connected solar photovoltaic systems totalling 1.56 MW-peak (MWp). These supply an annual peak demand close to 6.0MW to government, commercial and residential customers. Photovoltaic systems account for 22% of installed capacity but supply

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[1] Asian Development Bank (ADB). 2017. *Report and Recommendation of the President to the Board of Directors: Proposed Pacific Renewable Energy Investment Facility*. Manila.

[2] The Cook Islands, the Federated States of Micronesia, Kiribati, the Republic of the Marshall Islands, Nauru, Palau, Samoa, Solomon Islands, Tonga, Tuvalu, and Vanuatu. Smaller refers to population.

[3] Under the Scaling Up Renewable Energy Program in Low Income Countries

[4] In 2017, the PUB spent $6.1 million (57 percent of total expenditures) on diesel and lubricant. Approximately 49% of all imported diesel is used for electricity generation.

[5] Pacific Power Association. 2018. "*Utilities Benchmarking Report, 2017 Fiscal Year*", indicates the average supply costs across Pacific utilities is $0.32 per kilowatt-hour compared to 0.395 per kilowatt-hour for South Tarawa.

only around 9% of demand on South Tarawa. Diesel generation supply the remaining 91%. The photovoltaic systems were financed mostly by development partners. In 2016, demand on South Tarawa, the largest in the country, was approximately 24.5 gigawatt-hours (GWh).

5. PUB's diesel generation system on South Tarawa has low efficiency and incurs high cost of repairs and maintenance and large capital replacements on top of the high cost of fuel shipments. Due to lack of back up generation assets, PUB regularly conducts load shedding to cope when catastrophic events, such as generator failures, occur. Outer islands are served largely with solar home systems and Kiritimati island, the second largest load center (1.65 GWh in 2016), has a separate power system not managed by PUB. The government recognizes that renewable energy can reduce power generation costs, and support equitable socioeconomic growth and poverty reduction, but this must be complemented by supply side efficiency, demand side management, policy reform and improved tariff setting to ensure sustainability.

6. **Limited energy access and suppressed demand.** Half of Kiribati's population of 115,847 live in the capital, South Tarawa, which has a land area of only 16 km^2 (population density of over 3,600 per km^2). Of the 7,877 households in South Tarawa (44% of total households in Kiribati), 72.4% are connected to grid electricity. Access is largely for lighting, and that lighting is often insufficient, inefficient, and expensive. The high electricity cost has suppressed demand and has hindered growth in the commercial and tourism sectors. Demand in South Tarawa increased only 15% between 2010 and 2016 despite a 40% increase in customer base. On average, new customers consume less than existing consumers. In 2018 electricity demand grew by 10%, partly due to the introduction of a pre-paid metering system. In 2019, this seems to have reduced substantially, in part due to customers' inability or resistance to pay. PUB demand forecast for the coming 10 years is expected to remain at a low 2 percent growth per annum.

7. **Gender inequality.** Gender inequalities persist in the public and private sectors, and within the home. Unemployment is high (31%), and even higher among women (58%). Kiribati's poverty rate is estimated at 22% in 2006. South Tarawa has the highest number of poor people with a poverty rate of 24%.[6] Around 20-25% of households are headed by women. Overcrowding is stressing the natural environment, housing, land management, sanitation services and underground water reserves. Women are the most affected by energy poverty, suffering health problems caused by using biomass and kerosene for lighting, cooking and boiling water for drinking. Access to modern energy services reduces exposure to pollutants, saves time, and allow women to participate in the community, in decision-making and in income-generating activities.

8. **Constrained renewable energy deployment and lack of private sector presence.** Grid connected solar power has been identified as the least cost renewable energy alternative for South Tarawa.[7] Despite this and the significant technical resource potential for solar energy (554 MW), deployment has been limited. The growth of solar power is constrained by lack of energy storage to manage intermittency and transfer load to supply night-time demand. Other constraints include grid instability, weak institutional capacity and regulatory framework, affordability concerns, limited availability of financing, and reliance on development partner funding. Also, despite the potential for revenue generation from the high electricity costs, there are currently no independent power providers in Kiribati. Barriers to private sector investment include (i) lack of an enabling policy and regulatory framework, (ii) credit worthiness of PUB as an off-taker, and (iii) small transaction sizes.[8]

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6 Australia DFAT, "Kiribati Program Poverty Assessment", 2013.
7 IRENA. 2016. "*Kiribati Integrated Energy Roadmap: 2016–2025*". Bonn.
8 ADB's Private Sector Development Initiative supports reforms to expand private sector opportunities in Kiribati.

9. **Proposed solutions.** The South Tarawa Renewable Energy Project (STREP-the project), ADB's first in Kiribati's energy sector, will finance climate-resilient solar photovoltaic generation, a battery energy storage system, and will support institutional capacity building including the development of an inclusive and gender-sensitive renewable energy enabling environment and addressing barriers to private sector investment. The project will allow South Tarawa to increase renewable energy grid penetration from 9% to 44.45%, thereby exceeding the government target for South Tarawa of 36% renewable energy penetration by 2025. Increased solar generation will benefit the economy through reduced importation of fossil fuels and placing downward pressure on tariffs. Utilization of renewable energy also reduces GHG emissions which contribute to global warming and rising sea levels that render Kiribati among the most vulnerable. The project is expected to generate on average 6.01 GWh of clean electricity from solar photovoltaic, displace 1.6 million liters of diesel fuel consumption and avoid 4,809 tons of carbon dioxide equivalent (tCO_2e) greenhouse gas (GHG) emissions per year by 2024 for 25 years.[9] The transaction technical assistance is funded by the Strategic Climate Fund[10] and administered by ADB.[11]

10. **Alignment of development plans.** The government views increasing renewable energy as a key strategy to addressing affordability, energy access and climate change challenges and has prioritized sustainable renewable energy development. The project aligns with Kiribati 20-Year Vision 2016-2036,[12] the blueprint for Kiribati transformation which addresses government's objectives outlined in their Energy Policy (2009), the Kiribati Joint Implementation Plan for Climate Change and Disaster Risk Management 2014-2023,[13] and the Kiribati Development Plan for 2016-2019,[14] which seeks to increase I-Kiribati's access to high-quality and climate-resilient infrastructure, and to provide equal opportunity and outcomes for all I-Kiribati's by incorporating gender mainstreaming. The project will contribute to delivering government targets under KIER (footnote 8), their Climate Change Policy (2019),[15] and their Nationally Determined Contributions to reduce GHG emissions by 48.8 per cent, and fossil fuel consumption by 45 per cent in South Tarawa by 2025 through increasing renewable energy deployment. [16]

11. The project aligns with four of the seven operational priorities (OPs) under ADB's Strategy 2030: (i) addressing remaining poverty and reducing inequalities (OP 1); (ii) accelerating progress in gender equality (OP 2); (iii) tackling climate change, building climate and disaster resilience, and enhancing environmental sustainability (OP 3); and (iv) strengthening governance and institutional capacity (OP 6).[17] The project is in line with the objectives of ADB's 2009 Energy Policy,[18] and with the United Nations' Sustainable Development Goals. The project is consistent with ADB's Pacific Approach 2016–2020. [19] under which ADB's infrastructure program will harness renewable energy to drive down the cost of electricity, reduce risks, and reduce fossil

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9 The project will generate 6.16 GWh of solar electricity, displace over 1.64 million liters of diesel fuel, and avoid 4,928 tCO_2e GHG emissions in the first year of operation. Over its lifetime, the project will generate 150.31 GWh of electricity, displacing over 40 million liters of diesel, and avoiding 120,248 tCO_2e GHG emissions.

10 Under the Scaling Up Renewable Energy Program in Low Income Countries

11 ADB. 2019. *Regional: Preparing the Pacific Renewable Energy Investment Facility (Phase 2)*. Manila. This TA 9772-REG facility is funded by ADB's TA Special Fund 6 ($3 million) and the Strategic Climate Fund ($1 million).

12 Government of Kiribati. 2016. "*Kiribati 20-Year Vision 2016-2036 (KV20)*". South Tarawa.

13 Government of Kiribati. 2013. "*Kiribati Joint Implementation Plan for Climate Change and Disaster Risk Management 2014-2023*". South Tarawa.

14 Government of Kiribati. 2016. "*Kiribati Development Plan 2016-2019*". South Tarawa.

15 Government of Kiribati. 2019. "*Kiribati Climate Change Policy*". South Tarawa.

16 Government of Kiribati. 2015. "*Kiribati Intended Nationally Determined Contributions*". South Tarawa.

17 ADB. 2018. *Strategy 2030: Achieving a Prosperous, Inclusive, Resilient, and Sustainable Asia and the Pacific*. Manila.

18 ADB. 2009. *Energy Policy*. Manila.

19 ADB. 2016. *Pacific Approach, 2016–2020.* Manila.

fuel imports. ADB's assistance to Kiribati since 1974 total $116.99 million for 12 loans, grants, and technical assistance projects, mostly in public sector management and in the urban and water sectors.[20] Continuous support on government reforms and monitoring of protracted organizational changes are key lessons from completed ADB projects. The proposed project is included in ADB's country operations business plan for the 11 smaller Pacific island countries for 2019–2021.[21]

12. **Processing under the Pacific Renewable Energy Investment Facility.** Financing for the project will be processed under the facility. The project meets the following qualifying criteria as set out in the report and recommendation of the President for the facility (footnote 1):

(i) The project scope includes renewable energy generation and support for energy sector infrastructure through installation of solar photovoltaic system and BESS.
(ii) Kiribati is one of the 11 eligible Pacific Developing Member Countries (DMCs).
(iii) The project is aligned with the Kiribati 20-Year Vision 2016-2036 and is prioritized under the Kiribati Integrated Energy Roadmap (KIER) 2016-2025.
(iv) The project is classified category B for environment.

B. Project Description

13. The project's impact is renewable energy generation increased and greenhouse gas emissions reduced in Kiribati and its outcome is increased generation and utilization of clean energy in South Tarawa. The project has three outputs: (1) Solar photovoltaic and battery storage system installed; (2) enabling framework for renewable energy adopted; and, (3) institutional capacity in renewable energy project development, management and supervision enhanced.[22]

14. **Output 1: Solar photovoltaic and battery energy storage system (BESS) installed.** The project will install 4MW (5 MW peak) of climate-resilient, ground-mounted solar photovoltaic capacity and 5 MW/13 megawatt-hours (MWh) BESS, including related grid integration and control systems, on the Bonriki water reserve in South Tarawa.

15. **Output 2: Enabling regulatory framework for renewable energy adopted.** The project will assist in the creation of enabling frameworks for renewable energy development, including the development of a gender-sensitive energy act for submission to the Kiribati Parliament, to increase renewable energy deployment including through private sector investments.

16. **Output 3: Institutional capacity for inclusive renewable energy project development and implementation enhanced.** The project will provide institutional capacity building for stakeholders including on project management and supervision and operation and maintenance of renewable energy generation assets. Consulting services support for project management and for construction supervision, and comprehensive institutional capacity building, will be provided.

C. Value Added by ADB

17. The proposed project complements the South Tarawa Water Supply Project, approved in 2019 and funded by the ADB, the Green Climate Fund, and the World Bank.[23] This water sector project will also construct a photovoltaic and battery system in the same Bonriki water reserve

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20 https://www.adb.org/countries/kiribati/main
21 ADB. 2018. *Country Operations Business Plan: 11 Small Pacific Islands Countries, 2019–2021*. Manila.
22 All outputs incorporate gender elements, and corresponding performance indicators, and targets are detailed in the design and monitoring framework (Appendix 1).
23 ADB. 2019. *Report and Recommendation of the President to the Board of Directors: South Tarawa Water Supply Project*. Manila.

site to offset the electricity consumption of the reverse osmosis desalination plants it will install. The renewable energy system of the water supply project and the proposed project will be procured jointly to achieve economies of scale, guarantee consistency and compatibility in design and specifications, and ensure single responsibility under one contractor but with separate project-specific contracts, implementation timelines, and funding sources. This is the first joint procurement under two separate projects from different sectors within the Pacific Department and within ADB. The project design is also informed by the Government of New Zealand's initiatives in building PUB institutional capacity as well as in upgrading network capacity to avoid duplication, harmonize implementation timelines, ensure smooth grid integration, and guarantee technical and financial sustainability of the project and PUB. Other innovative features include (i) a rainwater harvesting system incorporated in the solar arrays, (ii) climate-resilient materials, foundations and structures, (iii) a tree planting program for protection of the water reserve, and (iv) the inclusion of an operation and maintenance services contract to ensure full capacity building for PUB before operational acceptance and handover given their lack of experience in battery systems.

D. Summary Cost Estimates and Financing Plan

18. The project is estimated to cost $14.70 million (Table 1). Detailed cost estimates by expenditure category and by financier are included in the project administration manual (PAM). [24]

Table 1: Summary Cost Estimates

Components	Photovoltaic (MW (MW peak))	BESS	Amount[a] ($ million)
A. Base Cost[b]			
Output 1. Solar photovoltaic and battery energy storage system			
1. PV	4.0 (5)		3.01
2. BESS		5 MW/13.0 MWh	6.52
3. Civil and Installation Works			0.70
4. Operation and Maintenance			0.30
Outputs 2 and 3. Enabling frameworks and institutional capacity building			
1. Capacity building program			0.10
2. Project implementation consultant			0.50
1 3. Project management support			0.30
Land acquisition and initial site preparation			**0.10**
Taxes and duties			**0.90**
Subtotal (A)			**12.43**
B. Contingencies[c]			**2.27**
Total (A+B+C)			**14.70**

BESS = battery energy storage system, kW = kilowatt, MW = megawatt, MWh = megawatt-hour.

[a] Excludes taxes and duties exemption of $0.90 million, and land acquisition and initial site preparation costs of $0.1 million financed by the government.

[b] In mid-2020 prices.

[c] Physical contingencies computed at 13.5% for the turnkey and consulting services contracts. Price contingency is based on expected inflation over the implementation period and includes provision for cofinancing administration fees and for potential exchange rate fluctuation under the assumption of a purchasing power parity exchange rate.

Source: Asian Development Bank estimates.

19. The government has requested a grant not exceeding $8 million from ADB's Special Funds (Asian Development Fund – ADF) resources to help finance the project. The Government

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

of Kiribati requested grant co-financing equivalent to $3.7 million from the Strategic Climate Fund,[25] and $2.0 million from the Government of New Zealand through the Ministry of Foreign Affairs and Trade, both to be administered by ADB. The government will finance $1.0 million comprising land acquisition and initial site preparation costs, and taxes and duties by exemption. The summary financing plan is in Table 2. ADB and cofinanciers will finance expenditures through cost-sharing. Climate mitigation cost is estimated at $13.33 million and climate adaptation cost is estimated at $0.40 million. ADB will finance 58% of mitigation costs and 50% of adaptation costs.[26]

Table 2: Summary Financing Plan

Source	Amount ($ million)	Share of Total (%)
ADB: Special Funds Resources (ADF Grant)	8.0	54.4
Strategic Climate Fund[a]	3.7	25.2
Government of New Zealand Ministry of Foreign Affairs and Trade[b]	2.0	13.6
Government	1.0	6.8
Total	**14.7**	**100.0**

ADB = Asian Development Bank, ADF = Asian Development Fund.

[a] Under the Scaling-Up Renewable Energy Program in Low Income Countries

[b] This amount includes provisions for currency fluctuations and payment of ADB's administration fees and bank charges or other charges pursuant to the Cofinancing Arrangement.

Sources: ADB estimates.

E. Implementation Arrangements

20. The Ministry of Finance and Economic Development is the executing agency.[27] The Public Utilities Board is the implementing agency. A steering committee will be established for the project. The TA consultant will also support PUB for pre-implementation works, including procurement. The project management unit to be set up in PUB will be supported by the project implementation consultant (PIC) for construction supervision and capacity building. Since ADB is administering cofinancing resources for ADF-financed operations, universal procurement applies.[28]

21. **Value for money (VfM).** Strategic procurement planning was conducted to choose the optimal procurement arrangement for the project. The project will achieve the best VfM by: (i) using the e-procurement technology to lower the transaction cost, enhance process efficiency and transparency; (ii) packaging the solar facilities of two projects (para. 17) and their O&M services together into single large package to ensure standardization of solar plant and BESS equipment in both projects and capture economies of scale; and (iii) recruiting an international consulting firm following quality and cost-based selection for effective implementation support. The implementation arrangements are summarized in Table 3 and detailed in the PAM (footnote 24).

Table 3: Implementation Arrangements

Aspects	Arrangements
Implementation period	December 2020–December 2023
Estimated completion date	31 December 2023
Estimated grant closing date	30 June 2024
Management	

[25] Under the Scaling Up Renewable Energy Program in Low-Income Countries (SREP)

[26] Details are in the Climate Change Assessment (accessible from the list of linked documents in Appendix 2).

[27] Supported by its Central Procurement Unit (CPU) and the Kiribati Fiduciary Services Unit (KFSU).

[28] ADB. 2013. *Blanket Waiver of Member Country Procurement Eligibility Restrictions in Cases of Co-financing for Operations Financed from Asian Development Fund Resources*. Manila.

(i) Oversight body	Project Steering Committee composed of secretaries of MELAD, MFED (chair), MISE, and chief executive officer of PUB		
(ii) Executing agency	Ministry of Finance and Economic Development		
(iii) Key implementing agencies	PUB will be the implementing agency with oversight from MISE. A PMU will be established at PUB, which will be led by a project manager and supervised by the PUB chief executive officer.		
(iv) Implementation unit	The PMU will be supported by a team of specialized experts.		
Procurement	OCB	1 contract	$11.5 million
Consulting services	ICS, SSS	5 contracts (90 person-months)	$0.3 million
	QCBS	1 contract (firm)	$0.6 million
Retroactive financing and/or advance contracting	Advance contracting will apply for procurement and consulting contracts. Retroactive financing will not apply.		
Disbursement	The ADB and ADB-administered grant funds will be disbursed in accordance with ADB's *Loan Disbursement Handbook* (2017, as amended from time to time) and detailed arrangements agreed upon between the government and ADB.		

ADB = Asian Development Bank, ICB = international competitive bidding, ICS = individual consultant selection, MELAD = Ministry of Environment, Lands and Agricultural Development, MFED = Ministry of Finance and Economic Development, MISE = Ministry of Infrastructure and Sustainable Energy, PMU = project management unit, QCBS = quality- and cost-based selection, SSS = single source selection, PUB = Public Utilities Board.
Source: ADB.

III. DUE DILIGENCE

A. Technical

22. The present yearly electricity demand in South Tarawa is around 29 GWh and is expected to grow by 2% annually. The total power rating available to PUB is around 5MW, sufficient to meet the above yearly demand when all diesel generation sets are operational. Because the instantaneous diesel power available is limited to 5MW, occasional brownouts and blackouts occur when the instantaneous demand is higher than this value; then load shedding is initiated by PUB, which is a common occurrence in South Tarawa. To provide a quick response on minute basis, some gensets are operated at a low level estimated at 400 kilowatt (kW) from the PUB network data. The introduction of proven solar photovoltaic and BESS technology into the Tarawa grid serves to offset expensive, diesel-based electricity generation, without compromising the fast response that gensets can provide. The total electricity generation is not increased beyond the yearly 2% increase in demand; rather diesel electricity replacement is contemplated, at the least cost possible, and to save diesel costs and minimize GHG emissions. Due diligence and simulation showed the optimum project scope is a 5 MWp (direct current) or 4 MWac (alternating current) photovoltaic plant with a 5MWp/13.0MWh battery energy storage system.

23. The climate risk and vulnerability assessment undertaken classified the project as "medium-risk" and found vulnerability of the project to sea level rise, storm surge, swells and increased risk of flooding, extreme rain events and extreme wind gusts. Recommended adaptation measures are incorporated in the project design and specifications (footnote 26). To further ensure technical and financial sustainability, the project will also incorporate lessons learnt from previous solar projects in its design and specifications, including on ensuring structural integrity and resilience and climate-proofing of foundations, adaptation elements such as rainwater collection and storage and early community engagement.[29] It will include an operation and maintenance services contract and support for consulting services for project management

[29] This includes projects funded by the World Bank and the United Arab Emirates. Social safeguards issues can cause delays. Early and constant community consultation ensured acceptance and timely project processing.

and for construction supervision. It will also (i) include a comprehensive and inclusive institutional capacity development program covering technical aspects (photovoltaic and BESS design, construction, testing, commissioning, operation, and maintenance), financial and economic analyses, financial management, environmental and social safeguards, gender, community engagement, procurement, tariff, and governance; and (ii) use various methods and modalities such as workshops, lectures, hands-on training, certified training, and academic degree scholarships, with special focus on gender and inclusion.

B. Economic and Financial

24. Solar power will displace diesel generation, which is difficult to maintain and operate sustainably, emits GHGs, and is subject to wide price swings from overseas markets. The project is economically viable with an economic internal rate of return of 14.8%, exceeding the benchmark 9% discount rate. The financial analysis of the project provides the financial internal rate of return of 11%, which compares favorably with the weighted average cost of capital of 1.2%. Financial and economic viability is gauged by comparing the cost and benefit streams of scenarios with and without the project. The capital costs include base costs covering civil and electrical works, equipment, logistics, transport, and physical contingencies. The battery energy storage system (BESS) to be installed accounts for a large portion (over 60%) of the cost and by itself does not produce any energy, but rather enables renewable energy to be utilized. The BESS can support further photovoltaic capacity of 2,500 kW (35% of the total generation proposed), which, without the battery, would be not utilized. For the financial and economic analyses of the project, including the BESS, it is assumed that the solar connectivity potential of the BESS is fully utilized to access the complete benefits of the project. The benefits from the project will be derived from savings in the form of diesel fuel replaced by the power generated from solar. The project benefits will be the displaced fuel costs resulting from renewable energy generation and storage. The project is also expected to generate positive environmental benefits from replacing diesel plants with solar power plants, resulting in avoided nitrogen oxide, particulate matter, sulfur dioxide, carbon dioxide (CO_2) and other greenhouse gas (GHG) emissions. ADB's Guidelines for the Economic Analysis of Projects[30] specifies the GHG emission value as $36.3 per ton of CO_2 equivalent in 2016 prices, increased by 2% in real terms annually (i.e., equivalent to $39.3 per ton in 2020, and increasing by 2% every year thereafter). The sensitivity analysis suggests that the project performance is generally robust against identified risks.[31]

25. A financial appraisal of PUB was completed to determine its financial performance and sustainability. PUB's revenues are generated mostly from electricity and water and sanitation and tariffs are not sufficient to recover all the costs of operations. Over the past 5 years, electricity remains the largest source of revenues (over 80% of total sales) and fuel is the largest cost item contributing to over half of PUB expenditure. There is no formal tariff policy and regulatory framework for setting electricity tariffs and PUB's financial position is dependent on direct subsidies by the government in form of equity for new capital and liquidity support for fuel cost. With no ADB project, it is estimated that PUB has to increase its tariffs by average of 15% over the next 5 years to recover its costs. The government agrees to (a) develop a new tariff policy and settings to increase tariffs progressively to achieve full cost recovery; (b) undertake a periodic gender-sensitive review of tariffs and fees including an assessment of their impact on the low income households; and (c) initiate an implementation plan to achieve inclusive, gender-responsive cost-recovery tariffs. Given *substantial* risk of sustainability for PUB's electricity services, relevant training will be provided to PUB, and grant covenants have been agreed

[30] https://www.adb.org/sites/default/files/institutional-document/32256/economic-analysis-projects.pdf
[31] Financial Analysis and Economic Analysis (accessible from the list of linked documents in Appendix 2)

requiring annual petition for tariff revisions sufficient to cover operating costs, debt service and capital replacement, along with periodic assessment of tariff policy to achieve cost recovery.

C. Sustainability

26. Targeted capacity building and risk management action plans under the transaction TA and the project ensure sustained improvement in PUB's governance and institutional capacity to achieve the project outcome and maintain the outputs. The project is revenue-generating and has robust financial and economic internal rates of return that well exceed the hurdle rates. ADB's ongoing assistance for sector reforms in Kiribati, complementing other donor initiatives, such as the electricity tariff review and restructuring, enhancements to PUB's financial management systems and human resources, interventions for asset replacement, insurance, and support for project management and operation and maintenance, including the use of a design–build–operate contract, help ensure the satisfactory performance of PUB and the technical and financial sustainability of the project. Agreed grant covenants on PUB's financial performance and sustainability, along with tariff restructuring to achieve cost recovery, are included in the grant and project agreements. The gender-sensitive energy legislation, with focus on mainstreaming renewable energy, energy efficiency, and private sector participation, will be designed to strengthen the organizational arrangements, processes, and structures of Kiribati's energy sector to ensure financial, economic, social, environmental, and climate sustainability. The project has no long-term negative impacts on the environment but rather ensure the long-term sustainability of the Bonriki water reserve, which is the main source of freshwater in South Tarawa. The project's design and scope, gender action plan, resettlement plan and environmental management plan mitigate negative impacts on people and natural resources while enhancing inclusion, livelihoods, health, safety and environmental protection, and climate resilience.

D. Governance

27. **Financial management capacity**. PUB's financial management risk is *substantial,* and it lacks sufficient financial management capabilities and experience in managing externally funded projects. PUB's accounting policies, procedures, and financial reporting follow GAAP and national statutory reporting standards. PUB prepares all basic financial statements on timely manner and have been audited with no qualification in 2018-2019. PUB's internal audit unit responsible for reviewing the key operational performance. PUB has IT procedures and plan, including contingency for backup for its customers' and accounting database. PUB has very basic procedures on recording and disposal of fixed assets with defined matrix of responsibilities and approvals. However, PUB's accounting for assets management does not include classification on useful life of assets and impairments. PUB's accounting software does not integrate fixed assets database and all accounting updates are completed manually with high risk of incompleteness and error. Also, there is no overall asset management system to ensure long-term value is achieved from assets. Going forward, PUB's manual revenue recognition and accounting reconciliation with billing may adversely impact quality of accounts. Furthermore, timely adjustments in accounting policies and procedures on revenue recognition and accounts receivables will be consistent with on-going deployment of prepaid metering for domestic customers. Detailed internal control and risk assessments, and the financial management action plan have been prepared and are detailed in the PAM (footnote 24).

28. **Procurement capacity.** Kiribati has passed a new Public Procurement Act that is expected to be declared effective in the second half of 2020. ADB has been directly supporting the government of Kiribati in the development of its revised procurement legislation and associated capacity development activities. ADB completed a project procurement risk

assessment and a strategic procurement planning noting that the PUB will require external support to mitigate the procurement-related risks to the project. PUB does not have sufficient capacity or experience to undertake procurement of a project this size and complexity and the procurement risk is initially assessed as "*substantial*". Through support by the already engaged TA consultant (footnote 11), direct ADB assistance to consultant recruitment (via joint recruitment) and the engagement of additional consultants (individuals and firm) at the implementation stage, procurement risk related to the project is substantially mitigated.

29. **Anticorruption Measures**. An integrity due diligence was conducted on PUB, and no integrity risks were identified. ADB's Anticorruption Policy (1998, as amended to date) was explained to and discussed with the government and PUB. The specific policy requirements and supplementary measures are described in the project administration manual (footnote 24).

E. Poverty, Social, and Gender

30. The project will add larger scale ground-mounted solar photovoltaic and battery infrastructure that will increase renewable energy contribution and displace more diesel fuel and, as a result, help to reduce and stabilize generation costs in South Tarawa. The tariff review being conducted under the ADB technical assistance has a two-pronged objective of moving towards full cost recovery of PUB operations with provisions for asset replacement and operation and maintenance while ensuring equitable rate distribution which will benefit the consumers in the low-income bracket, including vulnerable groups, including women-headed households. A more sustainable and equitable energy supply from the project will not only benefit the entire population but will contribute to narrowing the gap between the economically poor and the rest of the population. Women will be among the key beneficiaries being the main energy consumers at the household level through cooking, cleaning, household management activities, lighting to contribute to personal safety at night, as well as micro-enterprises, home-based businesses, and informal livelihoods activities. Women in the project area will benefit from potential rainwater harvesting and other resource access provided by the project. They can also maximize power supply for income generating and productive activities and benefit from business skills gained, professional opportunities provided and capacity building activities under the project.

31. The project is categorized as effective gender mainstreaming. A gender action plan has been prepared.[32] Design features and targets include (i) arranging public awareness and stakeholder consultations to achieve 50% participation of women; (ii) if local workers are hired, having a target of at least 30% female local workers overall for construction, administration, maintenance, security, and supervision; (iii) developing and implementing formal PUB human resource gender policies, including equal pay for equal work between men and women by the end of 2021; (iv) securing funding and awarding in 2021 three academic scholarships for Kiribati women and then hiring them on graduation to technical positions in the PUB; (v) developing a household electricity demand management public awareness program; (vi) training women and men on business skills and carrying out the program, with presenters, 50% of whom are female, (vii) carry out gender-sensitive review of tariffs and laws relevant to enabling renewable energy development and private sector participation and incorporate in the draft energy act.

F. Safeguards

32. **Environment.** The project has been screened and categorized B for environment because the impacts will largely be site specific, with a small footprint generated during the

[32] Gender Action Plan (accessible from the list of linked documents in Appendix 2)

construction stage and for which mitigation measures can be readily designed and implemented. The environmental assessment has been prepared in accordance with ADB's Safeguard Policy Statement (2009) (SPS) and will be updated, following detailed design, to also comply with the laws and regulations of Kiribati. Converting grassland and tree-covered green space to solar PV arrays will have a net benefit on the infiltration rates of rainwater into the Bonriki freshwater lens. This is a critical natural asset for South Tarawa and the project will help to reduce the decline in water availability and water quality as well as avoid the risk of further encroachment of incompatible land uses and contamination. The potential impacts include earthworks and site preparations, limited vegetation removal, dust and noise generation, import and haulage of equipment and materials, presence of foreign workers, and health and safety risks. In order to address the impact associated with novel coronavirus disease (COVID-19) pandemic, specific provisions in the bidding documents and contracts for works under the project will be included, requiring that the contractors create a COVID-19 risk management plan to be incorporated into the health and safety plans and emergency response plans under the environmental management plan and implement a training program for prevention of communicable diseases, including COVID-19, to employees, in coordination with the local health authorities, the PIC and the PMU. To manage and mitigate impacts during operation, the PUB will implement measures identified in the environmental management plan covering correct disposal of used equipment such as batteries and inverters. Adequate mitigation measures have been incorporated into the environmental management plan.

33. **Involuntary resettlement.** [33] The project is classified category B for involuntary resettlement according to ADB's Safeguard Policy Statement (2009). The project will be implemented in an area of land that is leased by the government from customary landowners. The project will not result in compulsory acquisition of land, there will be no physical displacement impacts, nor impacts on livelihoods. There will be impacts on one communal water well, and over 600 trees. Consultations were conducted with affected persons and nearby communities. A Resettlement Plan has been prepared in compliance with the SPS and laws of Kiribati. The Resettlement Plan outlines the project impacts and has been disclosed to affected persons and made available on the ADB website. Prior to contract award, the Resettlement Plan will be updated and implemented (compensation and activities completed). The funds to implement the Resettlement Plan will come from government counterpart funds and the Ministry of Finance commits to ensure the funds are available for timely compensation payments to affected persons. If there are land ownership disputes in the project area at the time of compensation, undisbursed entitlements for affected assets will be deposited into an escrow-like account by the Ministry of Finance until land ownership claims are resolved. A compensation completion report will be submitted by PUB to ADB prior to contract award.

34. **Indigenous peoples.** The project is classified category C for indigenous peoples according to ADB's Safeguard Policy Statement. No distinct and vulnerable indigenous peoples will be affected, and all project activities will be implemented in a culturally appropriate and participatory manner.

G. Summary of Risk Assessment and Risk Management Plan

35. No significant issues are expected to arise in implementing the project. Key risks and mitigating measures are summarized in Table 4 and described in detail in the risk assessment and risk management plan. [34]

[33] Resettlement Plan (accessible from the list of linked documents in Appendix 2).
[34] Risk Assessment and Risk Management Plan (accessible from the list of linked documents in Appendix 2).

Table 4: Summary of Risks and Mitigating Measures

Risk	Mitigation Measures
Project implementation capacity Insufficient institutional, procurement, technical capacity and experience in implementing large-scale investment projects	ADB, the PMU, and the project implementation consultant will assist the PUB and MFED in procurement, project implementation, execution, monitoring, and administration. Institutional capacity building and consultant support will be provided. Market sounding was conducted to gauge and widen market interest before tendering. Operation and maintenance services will be included in the turnkey contract.
Governance Weak financial management and information systems capacity, lack of internal audit function within PUB, and potential misuse of funds	ADB will strengthen oversight during the project, which will include holding biweekly teleconferences and two review missions per year, and providing training in financial management and ADB disbursements. The PMU will have a qualified and experienced project accountant responsible for addressing issues raised in the project audit reports prepared by the KAO, in a timely manner. The Audit Act 2017 strengthens the powers of the KAO including undertaking of legal recovery actions.

ADB = Asian Development Bank, KAO = Kiribati Audit Office, MFED = Ministry of Finance and Economic Development, PMU = project management unit, PUB = Public Utilities Board.
Sources: Government of Kiribati and Asian Development Bank.

IV. ASSURANCES

36. The government, the MFED, and PUB have assured ADB that implementation of the project shall conform to all applicable ADB policies, including those concerning anticorruption measures, safeguards, gender, procurement, consulting services, and disbursement as described in detail in the PAM and grant documents.

37. The government, the MFED, and PUB have agreed with ADB on certain covenants for the project, which are set forth in the grant and project agreements.

V. THE PRESIDENT'S DECISION

38. The President, acting under the authority delegated by the Board through the approval of the Pacific Renewable Energy Investment Facility, has approved a grant not exceeding $8,000,000 from ADB's Special Funds resources (Asian Development Fund); and acting under the authority delegated by the Board, has approved the administration of the grant not exceeding $3,700,000 from the Strategic Climate Fund[35] and administration of the grant not exceeding $2,000,000 from the Government of New Zealand through the Ministry of Foreign Affairs and Trade to Kiribati for the South Tarawa Renewable Energy Project, on terms and conditions as are substantially in accordance with those set forth in the draft grant and project agreements.

Masatsugu Asakawa
President

xx November 2020

[35] Under the Scaling Up Renewable Energy Program in Low Income Countries

DESIGN AND MONITORING FRAMEWORK

Impact(s) the Project is Aligned with

Renewable energy generation increased[a] and greenhouse gas emissions reduced[b] in Kiribati.

Results Chain	Performance Indicators with Targets and Baselines[a]	Data Sources and Reporting	Risks
Outcome Increased generation and utilization of clean energy in South Tarawa	By 2024: a. Increased renewable electricity supply on South Tarawa to 44.45% of the generation mix (2017 baseline: 8.67%) b. Increased generation of solar PV power by an average of 6.01 GWh per year (2017 baseline: 2.37 GWh) c. Diesel fuel savings of 1.6 million liters per year on average (2017 baseline: 0) d. CO_2 equivalent emissions avoidance of 4,809 tons per year on average (2017 baseline: 0)	a-d. MISE, PUB, and KOIL annual reports and PUB hourly generation data	
Outputs 1. Solar photovoltaic and battery energy storage system installed	(2018 Baseline = 1.565MWp of solar PV) 1a. at least an additional 5 MWp PV commissioned and operational 1b. at least 5 MW (13 MWh) BESS commissioned and operational 1c. a contractor engaged for operation and maintenance services and related training for one year after commissioning 1d. contractor and PUB to involve in aggregate at least 50% women in PV and BESS construction, installation, operation and maintenance. 1e. At least two mandatory awareness, workshop and training for all project staff and contract workers on gender-sensitive renewable energy project design, installation, operation and maintenance, conducted upon mobilization and after commissioning, with at least 30% women participants (baseline: 0) 1f. At least two public awareness programs conducted on efficient electricity demand management targeting women's, youth and church organizations. Target: 50% women (baseline: 0)	1a-c. MISE and PUB annual reports 1a-c. Project progress reports	Costs of equipment and materials increases significantly beyond the estimate
2. Enabling framework for renewable energy adopted	(2018 Baseline = 0) 2a. Energy Act, including restructured tariff policy, approved based on gender-sensitive tariff review, and gender review of Kiribati Energy Policy, PUB Statement of Intent (Strategic Plan) and Recruitment Policy 2b. Updates and enhancements to grid codes approved	2a-d. MFED, MISE and PUB annual reports 2a-d. Project progress reports	Lack of agreement in higher levels of government

Results Chain	Performance Indicators with Targets and Baselines[a]	Data Sources and Reporting	Risks
	2c. Technical standards on renewable energy related electrical equipment, which follow New Zealand and Australian standards, adopted 2d. Model transaction documents for IPPs adopted		
3. Institutional capacity for inclusive renewable energy project development and implementation enhanced	(2018 Baseline = 0) 3a. At least 10 technicians (qualified electricians or licensed electrical, mechanical, civil engineers), including at least 2 women, who received certified training on solar photovoltaic (PV) and BESS design, installation and operation and maintenance are employed in PUB 3b. At least 5 vocational students, including at least 1 woman, receive on the job training at PUB and MISE for technical or information-technology related positions. 3c. Project Management Unit with at least 30% women staff established and operational. 3d. At least 40 stakeholders, including at least 30% women, participate in 2 national workshops on PV and BESS technology 3f. Gender-sensitive communication and advocacy strategy for PUB developed and adopted.	3a-e. MISE and PUB annual reports 3a-e. Project progress reports	.

Key Activities with Milestones

1. **Outputs 1**: Solar photovoltaic and battery storage system installed.
   - 1.1 Procure EPC contractor (Q4 2020 – Q1 2021)
   - 1.2 Award and mobilize EPC contract (Q2 2021)
   - 1.3 Contractor procures solar PV, BESS, and auxiliary systems (Q2 2021)
   - 1.4 Contractor installs and commissions solar PV, BESS, and auxiliary systems (Q2 2021-Q1 2022)
   - 1.5 Contractor operates, maintains and hands over solar PV, BESS, and monitoring systems (Q2 2022-Q2 2023)

2. **Output 2**: Enabling framework for renewable energy adopted.
   - 1.1 Finalize and circulate draft Energy Act, revisions to grid codes, technical standards (Q2-Q4 2022)
   - 1.2 Conduct stakeholder consultations (Q1-Q3 2021)
   - 1.3 Revise and recirculate documents and iterate (Q3-Q4 2021)
   - 1.4 Submit for deliberations, approval and adoption (Q1 2022-Q4 2023)

3. **Output 3**: Institutional capacity for inclusive renewable energy project development and implementation enhanced.
   - 3.1 Establish Project Management Unit (Q1 2021)
   - 3.2 Engage Project Implementation Consultant (Q1 2021)
   - 3.3 Project Implementation Consultant develop capacity building program (Q2 2021)
   - 3.4 Project Implementation Consultant organize and conduct training for public sector institutions and other stakeholders (Q2 2021-Q4 2023)

Key Activities with Milestones	
3.5 EPC contractor organize and conduct hands-on training in solar PV and BESS design, construction, operation and maintenance (Q1 2021-Q4 2023) **Project Management Activities** Monitor and guide process of enabling framework submission, consultations and approvals (Q1 2021–Q4 2023) Evaluate capacity building events. (Q2 2021–Q4 2023)	
Inputs	
Asian Development Bank:	$8.0 million (ADF grant)
Strategic Climate Fund:	$3.7 million (grant)
Government of New Zealand:	$2.0 million (grant)
Government contribution:	$1.0 million
Total:	**$14.7 million**

ADF = Asian Development Fund; BESS = Battery Energy Storage System; CO_2 = carbon dioxide; EPC = Engineering-Procurement-Construction; GWh = Gigawatt-hour; IPP = Independent Power Producers; KOIL = Kiribati Oil Company, MFED = Ministry of Finance and Economic Development; MISE = Ministry of Infrastructure and Sustainable Energy; MW = Megawatt; MWh = Megawatt-hour; PUB = Public Utilities Board.

[a] Government of Kiribati. 2016. *"Kiribati Intended Nationally Determined Contribution*". South Tarawa.

[b] IRENA. 2016. "*Kiribati Integrated Energy Roadmap: 2016–2025*". IRENA.

- **Contribution to the Asian Development Bank Results Framework:** To be determined.

Source: Asian Development Bank.

Endorsed:

Olly Norojono
Director, PAEN

LIST OF LINKED DOCUMENTS

http://www.adb.org/Documents/RRPs/?id=49450-021-2

1. Grant Agreement: Special Operations
2. Grant Agreement: Externally Financed – Government of New Zealand
3. Grant Agreement: Externally Financed – Strategic Climate Fund
4. Project Agreement
5. Sector Assessment (Summary): Energy
6. Project Administration Manual
7. Financial Analysis
8. Economic Analysis
9. Country Economic Indicators
10. Summary Poverty Reduction and Social Strategy
11. Risk Assessment and Risk Management Plan
12. Climate Change Assessment
13. Gender Action Plan
14. Initial Environmental Examination
15. Resettlement Plan

Supplementary Documents

16. Financial Management Assessment of Public Utilities Board
17. Stakeholder Communication Strategy
18. Procurement Capacity Assessment