PACIFIC ENERGY UPDATE 2020

26

ADB



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Notes:

In this publication, "\$" refers to United States dollars.

Unless otherwise cited, the source for all tables and boxes is information provided by ADB's Pacific Department to the author.

On the cover: Mele Tuifua, born and raised on the island of Ha' apai, is part of an all-woman crew that refurbish powerlines to provide clean, cheap, and reliable solar energy to the people of Tonga (photo by ADB).

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Welcome to the 2020 edition of the *Pacific Energy Update* of the Asian Development Bank (ADB). ADB's Pacific Department partners with governments, communities, and the private sector to increase access to electricity generated by clean and renewable sources of power. Our support to the Pacific seeks to increase renewable energy generation capacity; improve energy access and efficiency; and strengthen the enabling environment for resilient, low-carbon economic growth.

The Pacific Energy Update series provides an annual review of ADB's technical assistance, grant, and lending activities in the region. It showcases the impacts and outcomes of ongoing and recently completed initiatives as of December 2020, and describes select projects slated for implementation in the years to come. The Pacific Energy Update 2020 marks an important milestone for ADB's engagement in the Pacific energy sector, as the last energy update to review projects designed under the Pacific Approach, 2016–2020 strategic framework.

As ADB develops its new engagement strategy for the region (slated for approval in 2021), this year's energy update reflects on the key impacts and outcomes of energy sector work to date. It also considers the important changes brought on by the coronavirus disease pandemic, and how ADB will support its Pacific developing member countries to respond to this pressing issue. As ADB continues to scale-up its energy sector operations in the region, we reflect back on decades of partnerships and hard work, and look forward to the progress ahead.

Leah Gutierrez Director General Pacific Department

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ADB ENERGY OPERATIONS IN THE PACIFIC





ACTIVE COMPLETED PROPOSED



SOUTH TARAWA RENEWABLE ENERGY PROJECT Active—Total financing: \$13.7 million

SOUTH TARAWA WATER SUPPLY PROJECT Active—Total financing: \$54.59 million



NCREASING ACCESS TO RENEWABLE ENERGY PROJECT Active—Total financing: \$6 million

RENEWABLE ENERGY SECTOR PROJECT Active—Total financing: \$32.45 million

RENEWABLE ENERGY DEVELOPMENT AND POWER SECTOR REHABILITATION PROJECT Active—Total financing: \$26.76 million

SOLAR POWER DEVELOPMENT PROJECT Active—Total financing: \$3.0 million

ALAOA MULTIPURPOSE DAM PROJECT Proposed—Total financing: \$84.7 million

CYCLONE GITA RECOVERY PROJECT Active—Total financing: \$6.8 million

OUTER ISLAND RENEWABLE ENERGY PROJECT Proposed—Total financing: \$28.08 million

TONGA RENEWABLE ENERGY PROJECT Active—Total financing: \$44.6 million

ABBREVIATIONS

ADB	_	Asian Development Bank
BESS	_	battery energy storage system
CO ₂	-	carbon dioxide
COVID-19	_	coronavirus disease
DMC	_	developing member country
DRR	_	disaster risk reduction
EPC	_	Electrical Power Corporation
FSM	-	Federated States of Micronesia
IPP	_	independent power producer
MEC	_	Marshalls Energy Company
NUC	-	Nauru Utilities Corporation
O&M	_	operation and maintenance
PIC-11	_	11 small Pacific island countries
PNG	_	Papua New Guinea
SPEL	-	Sun Pacific Energy Limited
TA	_	technical assistance
TPL	-	Tonga Power Limited

WEIGHTS AND MEASURES

km ²	-	square kilometer
kW	-	kilowatt
kWh	-	kilowatt-hour
kWp	-	kilowatt peak
MW	-	megawatt
MWp	-	megawatt peak

OVERVIEW

The work of the Asian Development Bank (ADB) in the Pacific energy sector is empowering people and communities. Energy sector operations in ADB's Pacific developing member countries (DMCs) are financing new sources of renewable power, supply-side energy efficiency, and battery energy storage systems (BESSs) to help grids absorb intermittent sources of power. In addition, these operations are supporting stakeholders to improve sector governance, sustainability, regulation, and management.¹

As energy demand in Asia and the Pacific continues to grow rapidly, ADB is helping to improve energy systems with a threepronged approach that seeks to (i) promote energy efficiency and renewable energy resources; (ii) maximize access to energy for all; and (iii) promote energy sector reform, capacity building, and effective governance. This approach leverages national and regional partnerships to strengthen energy systems in support of low-carbon economic growth and to improve living conditions.

The Pacific DMCs have achieved considerable progress toward improving the quantity and quality of energy services, while reducing their greenhouse gas emissions. Governments and utilities across the region have strengthened energy sector management and built more efficient and resilient infrastructure, and communities are benefiting from greater access to clean power. However, further progress needs to be achieved.

ADB will continue to work with governments and partners across the Pacific to advance regional goals and deliver lasting impacts in the years to come. The following "By the Numbers" section signals some of the key milestones that ADB and its Pacific DMCs have accomplished together—highlighting inputs, results, and impacts of ADBs support in the region during 2007–2020.

Pacific DMC	Population ('000)	Land Area (km²)	Number of Islands and/or Atolls	GDP per Capita (current \$)	Electricity Access 2018 (%)
Papua New Guinea	9,288.0	462,840	over 600 islands	2,677.5	59
Fiji	895.0	18,333	320 islands, 106 inhabited	6,134.2	100
Solomon Islands	684.9	28,230	~1000 islands, 350 inhabited	2,060.9	67
Vanuatu	290.2	12,281	>80 islands, 65 inhabited	3,196.2	62
Samoa	200.9	2,934	10 islands	4,231.3	100
Kiribati	115.5	811	32 widely scattered atolls	1,587.0	100
Tonga	105.1	749	176 islands, 36 inhabited	4,793.5	99
Micronesia, Federated States of	102.0	701	607 islands	4,098.4	82
Marshall Islands	54.8	181	34 islands, mostly atolls	4,198.7	96
Cook Islands	19.2	237	14 islands	19,139.6	100
Palau	18.6	444	596 islands, 12 inhabited	14,840.4	100
Nauru	12.7	21	single island	9,297.0	100
Tuvalu	11.6	26	9 atolls	3,661.3	100
Niue	1.8	259	single island	18,099.6ª	100

Table 1: Country Data, 2019

DMC = developing member country, GDP = gross domestic product, km² = square kilometer.

^a Latest available data from 2016.

Sources: Asian Development Bank. Data Library. GDP Growth in Asia and the Pacific, Asian Development Outlook; Asian Development Bank. Pacific Economic Monitor Database. https://data.adb.org/dataset/pacific-economic-monitor-pacmonitor-database (accessed November 2020); International Bank for Reconstruction and Development / The World Bank. 2020. Tracking SDG7: The Energy Progress Report. Washington, DC; and Secretariat of the Pacific Community, Statistics for Development Division. Key Statistics Database. http://sdd.spc.int/pw (accessed November 2020).

¹ ADB's 14 Pacific DMCs comprise the Cook Islands, Fiji, Kiribati, the Marshall Islands, the Federated States of Micronesia (FSM), Nauru, Niue, Palau, Papua New Guinea (PNG), Samoa, Solomon Islands, Tonga, Tuvalu, and Vanuatu.

By the Numbers—ADB's Support for the Energy Sector in the Pacific



Note: Totals include cofinancing, government contributions, and equity (Figure 2). Source: Asian Development Bank (Pacific Department).

Figure 2: Total Energy Sector Investment by the Financing Sources (2007–2020) (\$ million)



ADB = Asian Development Bank.

Notes:

1. "Others" are based on ADB's Private Sector Operations Department investments in Samoa.

2. Cofinancing totals are derived from associated ADB project documents.

Source: Asian Development Bank (Pacific Department).

Energy operations represent ADB's second largest sector by lending volume in the Pacific. Total cumulative approvals for energy operations during 2007–2020 reached \$945 million in 2020—including significant contributions from development partners, host governments, and (increasingly) from the private sector. ADB's collaborative approach to lending and grants allows it to deliver more transformative impacts than would be possible on an individual basis. The blend of grant and lending reflects the need for concessional assistance in the region, as the Pacific island nations continue to strengthen their economies and responsibly manage the risks of debt distress.







The majority of ADB's energy sector support in the region goes to power generation, including renewable sources of power such as solar, wind, and hydro. ADB has also made significant investments to improve transmission and distribution networks, both to enhance supply-side efficiency and to increase access to electricity. Increasingly, ADB is helping improve grid stability with battery storage, which will allow the Pacific island nations to introduce additional sources of intermittent and renewable power supply to their grids. In terms of the geographical footprint in the region, many of ADB's energy projects have focused on Papua New Guinea (PNG) and Solomon Islands, which have among the largest populations in the region. However, new regional approaches to financing, such as the Pacific Renewable Energy Investment Facility (p. 8), will enable ADB to design and implement replicable project models more swiftly across the region.

Results of ADB's Assistance in the Pacific

Grant and lending activities in the region are producing transformative results. From 2007 to 2020, ADB helped finance and construct about 94.3 megawatts (MW) of additional installed capacity across the region. Extending transmission and distribution networks has helped deliver clean sources of power to people and communities that did not previously have access to electricity. During 2007–2020, ADB's support to build new renewable energy generation units, paired with help to extend transmission and distribution networks, has connected 15,646 households to electricity.



Figure 6: Transmission and Distribution Lines Built or Upgraded during 2007-2020 (kilometers)





Impacts of ADB's Support to the Pacific

ADB's assistance is driving impacts in the region, which have global significance. The installation of renewable energy generation is reducing the need to use fossil fuels for power generation, which helps the Pacific developing member countries (DMCs) to put less carbon dioxide into the atmosphere. In addition to avoiding greenhouse gas emissions, replacing diesel generation with renewables is supporting the Pacific nations to strengthen their fuel security, and build resilience to economic shocks.



Source: Asian Development Bank (Pacific Department).

Box 1: Strategy 2030—In Support of Better Energy Systems and Achieving the Sustainable Development Goals in the Pacific

Achieving reliable access to clean energy is essential to human development and low-carbon economic growth. ADB is committed to supporting global initiatives that improve human lives alongside socioeconomic development. The objectives set out in ADB's Strategy 2030 are closely aligned with the United Nations' Sustainable Development Goals, and signal ADB's support to help its Pacific developing member countries improve quality of life while taking climate action. The following figure maps the relationship between Strategy 2030's priorities and the Sustainable Development Goals, while the subsequent section describes how energy sector operations in the Pacific are supporting ADB's Strategy 2030 implementation in the region.



Mapping ADB's Operational Priorities and the Sustainable Development Goals

ADB = Asian Development Bank, tCO_2 = ton of carbon dioxide. Source: Asian Development Bank (Pacific Department).

Strategy 2030 of the Asian Development Bank (ADB) sets operational priorities for achieving a more prosperous, inclusive, resilient, and sustainable development path in Asia and the Pacific. To do so, it establishes seven operational priority areas that guide ADB's operations. Strategy 2030 icons (pictured below) throughout this publication highlight the ways in which Pacific energy initiatives are aligned with Strategy 2030. The following descriptions highlight the key ways in which energy sector operations are aligned with the focus areas of Strategy 2030.



Addressing remaining poverty and reducing inequality by connecting homes and businesses to electricity for the first time; and by training people to participate in the formal economy or start new businesses, leveraging new electricity resources.



Tackling climate change, building climate and disaster resilience, and enhancing environmental sustainability by helping countries reduce their emissions from power generation, constructing infrastructure that is resilient to natural hazards, and mobilizing capital to rapidly respond to natural disasters with a "build back better" approach.



Accelerating progress in gender equality by integrating gender training into capacity building and workshops, and supporting women to access jobs and decision-making roles in the formal economy.

Box 1 continued



Making cities more livable by increasing access to clean electricity and efficient grid infrastructure. Energy sector operations are also helping increase the resilience of urban infrastructure, and supporting cross-cutting solutions, including in water and sanitation systems across the Pacific.



Promoting rural development and food security by extending grid connections to rural areas to enable cold food storage with new electricity connections; and engaging rural communities in the construction, operation, and maintenance of energy infrastructure.



Fostering regional cooperation and integration by engaging countries, companies, and development partners in dialogue to identify and overcome common challenges; and by implementing regional solutions with technical assistance and programmatic financing.



Strengthening governance and institutional capacity by working with regulators and other institutions to align energy sector policies with international best practices, and by helping reform tariffs to support cost recovery and the financial sustainability of power utilities.

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



REGIONAL

The Pacific region faces a unique set of energy challenges. Its limited supply of domestic fossil fuel resources has led to a historical dependence on imported diesel for power generation, and a corresponding vulnerability to fluctuating energy prices. At the same time, outdated power infrastructure, geographical dispersion, small economies of scale, and limited generation capacity lead to high electricity tariffs (or costly subsidies), transmission and distribution losses, and low electrification rates in a number of the Pacific DMCs.

To overcome regional energy constraints, the Pacific DMCs have embarked on a structural shift toward renewable energy, and away from diesel power generation—many Pacific DMCs are targeting as much as 100% renewables for their power generation mix, alongside increased access to electricity and more resilient infrastructure. The transition to cleaner, more efficient power is reducing dependency on imported fossil fuels, increasing access to affordable and reliable electricity, and supporting climate change mitigation by reducing carbon dioxide (CO_2) emissions.

The Pacific DMCs have great potential to strengthen local economies and enhance quality of life as they modernize their energy sectors. ADB's work in the Pacific is empowering people and communities by financing solar, wind, hydropower, and battery energy storage, alongside efficient transmission and distribution lines. Various technical assistance (TA) initiatives are helping utilities to operate more efficiently—with advisory services to improve financial management and corporate governance—through legal, policy, regulatory, and institutional reforms.



Status: Active ADB financing: \$200 million Cofinancing: \$500 million (cumulative) Total financing: \$700 million (indicative)

The **Pacific Renewable Energy Investment Facility** is streamlining ADB and development partner investments in the 11 small Pacific island countries (PIC-11) by approving a \$700 million facility to finance a large number of small-value renewable energy projects of up to \$200 million in cumulative ADB finance.²

The facility is designed to achieve a paradigm shift in the Pacific region—helping Pacific DMCs rapidly move from their current energy pathway (which is almost entirely dependent on fossil fuels) to one that is low-carbon and climate-resilient and provides greatly increased levels of energy access to marginalized populations.

The facility is improving the efficiency of donor support by enabling development partners to deploy a larger volume of smallscale projects in rapid succession. The financing modality is based on the observation that renewable energy projects in the Pacific are typically small, often require similar project preparatory activities as large projects, and have historically required individual processing and approval. By grouping projects into a single facility, development partners and governments will be more capable of sharing knowledge and resources, and regional donors will be able to process assistance packages more efficiently. Improvements to ADB's project processing efficiency to date, through the facility, have been significant—with an 18% reduction in processing time, a 24% decrease in consultant recruitment time, and an 11% increase in the number of projects processed.

Overall, the facility is providing pre-implementation support for about 20 renewable energy projects over an 8-year period. To date, it has enabled ADB and partner governments to approve 8 projects in 6 PIC-11 countries, with an additional 12 in the pipeline for approval during 2020–2023. The facility is being supported by three transaction TA facilities for project preparation, capacity building, and reforms. In order to identify and help implement new technology options under the facility, ADB is establishing a fourth regional transaction TA facility, the \$2.0 million TA for **Preparing Floating Solar Plus Projects**. The TA will help prepare three proposed floating photovoltaic projects in Kiribati, Tonga, and Tuvalu; develop a road map for deploying floating photovoltaic projects in the PIC-11; and leverage collaboration with development partners and the private sector.

² The PIC-11 are the Cook Islands, Kiribati, the Marshall Islands, the Federated States of Micronesia (FSM), Nauru, Palau, Samoa, Solomon Islands, Tonga, Tuvalu, and Vanuatu.

Targeted physical improvements to the energy sector across the Pacific will include the following:



Installation of **70 MW of solar, wind,** and hydropower generation capacity including floating solar systems



Installation of **75 megawatt-hour** (MWh) BESSs



Construction or rehabilitation of 100 kilometers of transmission and distribution lines

The facility has helped achieve rural electrification through the Outer Island Renewable Energy Project and the Renewable Energy Project, both in Tonga (p. 39). The facility also finances projects for supporting grid infrastructure to increase energy security. Two projects in the Marshall Islands rehabilitated a 6 million-gallon diesel tank farm and procured 500 advanced meters.

The facility is also overseeing energy sector reforms, promoting private sector engagement and investment opportunities, preparing further investment channels, and disseminating best practices and lessons learned. It is fostering regional economic development through improved energy infrastructure, and more efficient donor support. The facility's impact will be improved energy security across the Pacific, and its outcome will be the increased generation of clean energy at lower costs.

Capacity Building and Sector Reform for Renewable Energy Investments in the Pacific

Status: Active ADB financing: \$0.8 million Cofinancing: \$5.0 million Total: \$5.8 million

The TA for **Capacity Building and Sector Reform for Renewable Energy Investments in the Pacific** is supporting the long-term sustainability of infrastructure and investments in energy sectors across the region.

The TA is financed on a grant basis, with contributions from ADB and the Green Climate Fund, and is being implemented by ADB. It is (i) conducting a comprehensive assessment of utilities' operations and performance; (ii) reviewing their business processes, systems, and management practices; (iii) reviewing policy, regulatory, and governance arrangements; (iv) providing reform recommendations and support for policy dialogue; (v) fostering coordination among regional peers to implement reforms;³ and (vi) preparing sustainable investment programs and financing plans of 11 Pacific DMCs.⁴ The TA is improving energy security across the Pacific region by supporting utilities to operate more sustainably and to generate cleaner power at lower costs. Works with the Chuuk Public Utilities Corporation and Pohnpei Utilities Corporation (both in the FSM) as well as with Marshalls Energy Company (in the Marshall Islands) have been completed.

³ The \$5.0 million grant financed by the Green Climate Fund and administered by ADB TA will cover seven Pacific DMCs: the Cook Islands, FSM, the Marshall Islands, Nauru, PNG, Samoa, and Tonga.

⁴ The ADB financing of \$0.8 million is intended to support sector reform, private sector development, and capacity building in the FSM, Kiribati, the Marshall Islands, Nauru, PNG, Palau, Samoa, Solomon Islands, Tonga, Tuvalu, and Vanuatu.

Box 2: Reforms and Capacity Building to Strengthen Long-Term Sector Sustainability

The Asian Development Bank (ADB) is working closely with governments, utilities, and regulators to build the foundations of more sustainable energy sectors across the Pacific. The two key constraints to long-term sector sustainability in the region are (i) inefficient policies, regulations, and tariff structures; and (ii) limited capacity to implement reforms and manage key institutions, including utilities and energy sector regulators. These constraints lead to inadequate service levels, poor commercial performance of utilities, insufficient operation and maintenance, and limited private sector investment.

Strengthening policy and regulatory environments, alongside human and institutional capacity, is essential for supporting long-term sector sustainability. Building capacity and supporting sector reforms are, therefore, central to ADB's work in the Pacific energy sectors. Core areas of support include (i) working with governments to design effective policies and regulations; (ii) helping establish and modernize energy sector regulators, in line with international best practices; (iii) supporting tariff reforms to promote cost-recovery and affordable access to electricity for the poor; and (iv) working closely with utilities to improve governance, service levels, and commercial performance.

ADB supports energy sector reforms and capacity building through a number of different channels, including stand-alone technical assistance (TA), policy-based loans and grants, and specific covenants under its infrastructure projects.

TA initiatives are (i) building human and institutional capacity in the areas of accounting, management, and governance; (ii) reviewing tariff structures to encourage cost recovery without the need for government subsidies; (iii) supporting utilities to improve commercial performance through business process reengineering; and (iv) helping plan and implement prudent pipelines of investments to meet sector goals. Some examples include the regional TA initiatives for **Capacity Building and Sector Reform for Renewable Energy Investments in the Pacific (p. 9)** and **Development of the Pacific Energy Regulators Alliance (p. 11)**.

Policy-based loans are another key instrument for supporting Pacific energy sector stakeholders to strengthen key institutions and the broader clean energy enabling environment. The **Palau Public Utilities Corporation Reform Program** (p. 16), for example, is delivering sequenced and programmatic support to the utility to strengthen its commercial performance in a resource-constrained operating environment. The policy-based loan modality enables ADB to provide financial assistance or budget support with direct correlation to the achievement of reform milestones.

Project-based grants and lending can also play a critical role in supporting reforms and capacity augmentation. ADB frequently integrates capacity building and support for institutional reforms into its projects. In some cases, where institutional barriers may present risks to implementation, ADB integrates payment milestones into its loan covenants—this helps protect against implementation risks and ensure the timely implementation of institutional reforms.

For example, in the Marshall Islands, ADB included specific covenants for the **Energy Security Project** to link payment milestones to the completion of specific activities, including restructuring of the utility, tariff reforms, and the provision of adequate funds to support sustainable operation and maintenance (p. 21). As of June 2019, the utility's board had formally approved a reform strategy, and ADB is currently providing support to implement key changes. In parallel, the government has transferred state-owned assets to the utility's books to improve its balance sheet and strengthen overall commercial performance of the energy sector.



Development of the Pacific Energy Regulators Alliance

Status: Active ADB financing: \$0.225 million

Robust, predictable, and effective regulations are essential to attracting private sector investment into energy sectors across the Pacific. However, utility regulation in the region remains in its infancy. In most instances, electricity services are provided by stateowned, vertically integrated natural monopolies, with sector regulatory decisions driven by political imperatives, often on an ad hoc and unpredictable basis. Regulatory and governance regimes of this nature, especially in capital-constrained environments, do not provide for efficient management of scarce resources, and can significantly limit investor confidence.

ADB is working with regulators across the region to build a community of best practices, which will help strengthen sector policy and regulation, improve utility management performance, and improve the private sector investment climate. The **Development** of the Pacific Energy Regulators Alliance TA will promote modern regulation of energy utilities in the region by developing a regional platform to deliver capacity building, enable the exchange of knowledge and skills, and help the Pacific DMCs to pool limited resources to address common challenges. The alliance will leverage a regional approach to strengthen individual power markets in the affiliated Pacific DMCs.

Pacific Renewable Energy Program

Status: Active Total financing (ADB): \$100.0 million

The **Pacific Renewable Energy Program** is designed to encourage private sector investment by using donor funds to backstop the payment obligations of power utilities. The design for each project under the program includes one or more of the following forms of financing support: partial risk guarantee, direct loan, letter of credit, and TA. It mitigates short-term liquidity risk through a donor-backed standby letter of credit, and supports long-term investment through a partial risk guarantee.⁵

The Pacific Renewable Energy Program leverages ADB's comparative advantages in implementing renewable energy projects in the Pacific to encourage private sector participation, including through ADB's Private Sector Operations Department. This cross-departmental approach reflects ADB's commitment to multidisciplinary problem-solving, which is encapsulated in its "One ADB" approach. The program is designed to leverage collaboration between ADB's Pacific Department, its Private Sector Operations Department, and external private sector entities across the region. The program has enabled ADB to engage in private sector renewable energy development in Tonga, leveraging the One ADB approach to deliver finance to independent power producers (IPPs) (p. 28).



⁵ ADB's comprehensive support to scale-up private sector participation in clean energy sectors across the Pacific is outlined in Box 6 on p. 33.

COOK ISLANDS

Hospital with installed solar panels on their rooftop in Rarotonga, Cook Islands. (photo by ADB).



Historically, the Cook Islands has been almost entirely dependent on imported diesel for power generation. In 2012, about 99% of power generation in the Cook Islands came from diesel, and the corresponding fuel costs were about \$29.8 million, or 25% of the country's total imports.

Supplanting diesel power with renewables can reduce the cost of generation by up to 40%—lowering household and business expenditures on electricity, improving fuel security, and reducing carbon emissions. ADB is supporting the Cook Islands to reshape its power sector by investing in solar energy and battery storage, and by building capacity to manage new assets sustainably.



Status: Active ADB financing: \$8.92 million Cofinancing: \$23.53 million Total financing: \$32.45 million

The **Renewable Energy Sector Project** is installing solar-generating systems on five islands. The photovoltaic systems will provide a combined installed capacity of about 2 megawatt peak (MWp), coupled with batteries to store electricity from solar energy. The project is also building institutional capacity to attract private sector investment in new renewable energy projects.

In 2017, the Global Environment Facility and the Green Climate Fund awarded two separate additional financing grants that have significantly expanded the scope of the original project. The additional financing is installing a total of four BESSs to provide load shifting and grid stability. BESS installations are allowing the state-owned utility, Te Aponga Uira, to connect more intermittent electricity generated by solar, without negatively affecting the grid. The addition of BESSs is enabling for private sector to bring in more renewables into the country.



Box 3: Poverty Reduction and New Job Opportunities for Women on the Outer Islands

The Renewable Energy Sector Project is empowering women and communities across the Cook Islands. It has already connected solar photovoltaic and battery storage systems as mini-grids on the five small islands of Atiu, Aitutaki, Mangaia, Mauke, and Mitiaro. These installations have reduced electricity tariffs and oil imports on the outer islands, and are delivering more reliable electricity supply, improved living conditions, and new livelihood opportunities for the surrounding communities. Works completed provide clean and affordable electricity to 1,500 people—or 9% of the nation's population—and have contributed to the following additional benefits:

- (i) 100% access to electricity on the five islands,
- (ii) annual fuel imports in 2019 reduced by 5 million liters against the 2012 baseline,
- (iii) \$6.9 million in annual savings from reduced fossil fuel consumption, and
- (iv) residential tariff reduced from \$0.63 per kilowatt-hour to \$0.47.

The project has had transformative impacts on quality of life and income generation on the outer islands. Improved electricity supply has expanded access to information and communication technology, including computers, televisions, radios, the internet, and mobile connectivity. Outer islanders are increasingly using electric appliances for income-generating activities such as producing coconut oil, sauce, and jam from local produce.

In addition to supporting job creation indirectly, the project is teaching women and girls on the outer islands to participate in the solar industry, and hiring them directly.

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Box 3 continued

"With the extra savings we focused on employment opportunities for our young people who otherwise may have left the island. We started off originally with four boys who were school leavers...and that has developed into two teams of six girls each, who work on a rotating weekly roster. Each team of six girls is supervised by the public utilities staff."

-Anthony Whyte, Executive Officer, Mangaia Island Administration

"The solar utility gave me a chance to be employed, and it helps to keep me on the island rather than migrating. I am thankful that I am one of those maintaining the solar site."

—Maara Tokorangi, Solar Girls Team

"One of the benefits of the project is utilizing young unemployed women like myself to work most of the time at the Mangaia solar plant."

-Rose Samuel, Solar Girls Team



The Solar Girls Team on the job.



Members of the Solar Girls Team performing maintenance on solar cells.

Source: Mangaia Government. 2020. Letter correspondence titled "Solar Girls." Mangaia.



FEDERATED STATES OF MICRONESIA



The FSM comprises four states—Chuuk, Kosrae, Pohnpei, and Yap—spread across 607 islands in the West Pacific. Each state enjoys considerable autonomy, with responsibility for many public services (including power sector management) devolved from the central government.

As a whole, the FSM is working to lower its dependence on imported diesel for power generation, and to reduce its exposure to fluctuating fuel prices. State targets are aligned with the FSM's National Energy Policy (2012), which seeks to reduce generation costs and address energy security in a financially and environmentally sustainable manner. National targets include 30% power generation from renewable energy sources, a 50% increase in end-use efficiency, and a 90% rural household electrification rate by 2020.⁶

ADB is supporting the FSM by addressing diverse power sector needs at the state level. In December 2018, ADB completed the Yap Renewable Energy Development Project, and is processing a second project under the Pacific Renewable Energy Investment Facility, which will scale-up support for the power sectors in Kosrae and Yap, and improve the operations of the Pohnpei Utilities Corporation.

⁶ Of the FSM's total population of approximately 111,000 people, about 55% enjoy access to electricity. However, this figure varies widely between states.

Renewable Energy Development Project

YAP STATE

Status: Active

Total financing (ADB): \$19.0 million (\$15.0 million and \$4.0 million proposed additional financing)

The Renewable Energy Development Project is increasing the renewable energy penetration rate on Kosrae and Yap, and will contribute to increased fuel security for the FSM as a whole. In addition to integrating solar photovoltaic systems into the main grids on Kosrae and Yap, the project is constructing a solar hybrid mini-grid and installing solar home systems to increase access to high-quality electricity services on the remote island of Walung, in Kosrae. The project is financing the following:

800 kW/800 kilowatt-hours (kWh) **BESS** at the power station photovoltaic

1.95 MWp of ground-mounted solar

300 kilowatt peak (kWp) of rooftop solar photovoltaic at the sports center, and



upgrade to power station supervisory control and data acquisition (SCADA) systems.



1.15 MWp of solar photovoltaic on the main grid

KOSRAE

60 kWp solar photovoltaic for the Walung mini grid

30 kW of high-efficiency diesel generation for the Walung mini grid



30 kW/ 160 kWh BESS for the Walung mini grid, and

9 solar home systems installed in Walung.

The project is supporting the FSM to (i) expand its population's access to modern energy services; (ii) improve service quality, reliability, and climate resilience; and (iii) reduce its reliance on fossil fuels for power generation, with corresponding reductions in generation costs. The project will also support the implementation of key reform actions for the Pohnpei Utilities Corporation, which were developed in early 2019 under the regional TA on Capacity Building and Sector Reform for Renewable Energy Investments in the Pacific (p. 9).

Proposed additional financing will enhance the DRR capacity of utilities in the FSM and improve the distribution networks in Kosrae and Yap. The \$4 million additional financing grant will be used to procure equipment and spare components to reduce outages and improve renewable energy utilization in Kosrae and Yap; and will help purchase equipment and spares in Pohnpei to improve disaster resilience. The additional financing adds a new output to the project, which will improve the DRR capacity of all FSM utilities by developing a disaster resilience plan, conducting geographic information system mapping, and providing O&M and DRR capacity building to the utilities.



KIRIBATI

Households in Tarawa benefit from power supply (photo by ADB).

Kiribati is a remote Central Pacific country comprising 32 atolls and a coral island with a total land area of 810 square kilometers (km²) widely dispersed over an exclusive economic zone of 3.5 million km² and spread across three island groups and time zones. About half of the nation's 115,847 residents live in the capital of South Tarawa. Kiribati's distance from major markets and most resources leads to high import costs, while the county's low elevation—averaging only 2 meters above sea level—creates high vulnerability to storm surges, sea level rise, saltwater intrusion, and other natural hazards associated with climate change. Building resilience to changing weather patterns is essential in safeguarding the population.

At the same time, Kiribati is heavily reliant on imported diesel for power generation, which exposes it to fluctuating fuel prices and contributes to one of the highest costs of generation in the region—\$0.36 per kWh, against the regional average of \$0.32. Although 72% of the population in South Tarawa is connected to grid electricity, the high cost of electricity suppresses demand, impedes business growth, and contributes to energy poverty in households, which disproportionately affects women.

The Kiribati Integrated Energy Roadmap, 2017–2025 identifies solar power as the least-cost option for scaling-up renewable power generation and improving fuel security. South Tarawa has 1.57 MWp of grid-connected solar plants, but there remains a significant untapped potential to scale-up the use of renewable energy for power generation—about 554 MWp of solar and 1.1 MWp of wind potential.

The central barriers to scaling-up renewable energy generation in Kiribati include (i) lack of energy storage to manage intermittency and supply nighttime demand, (ii) limited financing options apart from development partner resources, and (iii) a policy and regulatory environment that is not conducive to private sector investment.

ADB is leveraging cross-cutting solutions to support Kiribati in enhancing resilience to climate change, strengthen fuel security, and build an enabling environment for further investment in renewable energy power generation.



Status: Active ADB financing: \$8.0 million Cofinancing: \$5.7 million Total financing: \$13.7 million

The **South Tarawa Renewable Energy Project** will directly increase the share of renewable energy serving the grid in South Tarawa, and will pave the way for further investments in clean energy. The project will deliver financing from the Pacific Renewable Energy Investment Facility to do the following:





Install **5 MWp** of solar photovoltaic

Install a 13 MWh BESS



Create an enabling framework for renewable energy and private sector investments



Build institutional capacity in project management, and O&M for renewable generation assets

The project will help the country achieve its 2025 targets for renewable energy grid penetration, diesel fuel savings, and emissions reductions for South Tarawa. It will contribute more than 23% of renewable energy on the South Tarawa grid and, together with the South Tarawa Water Supply Project renewable energy component (p. 21), will enable an increase from 9% to more than 44% renewable energy penetration in the South Tarawa grid. The project will make it possible to introduce additional renewable energy generation capacity into the grid by modernizing and strengthening the network; adding a large BESS; and helping develop an enabling environment for further investment in the sector, including through private sector investments. Increased access to affordable clean power will help drive economic growth and improve living conditions in the nation's capital.



🕕 🎓 <table-cell-rows> South Tarawa Water Supply Project

Status: Active ADB financing: \$13.00 million Cofinancing: \$41.59 million Total financing: \$54.59 million

The water supply in South Tarawa relies almost entirely on freshwater underground lenses and rainwater, which are increasingly threatened by sea level rise and droughts. As such, protecting the water supply in South Tarawa is of central importance to the 62,298 people living in the nation's capital. ADB is collaborating with the government, the Green Climate Fund, and the World Bank to implement a project that will dramatically increase water security and climate resilience for all residents of South Tarawa.

The **South Tarawa Water Supply Project** is constructing a seawater reverse osmosis desalination plant that can produce 4,000 cubic meters of water per day. It will install a 2.5 MW solar array and a 500 kWh battery system to offset the electricity consumed by the desalination plant. The project is also upgrading 1 kilometer of the existing power network that connects the facility to the grid to ensure all assets are built with a climate-resilient design.

The project will teach local communities about climate change, water, sanitation, and hygiene; and train the utility to manage and maintain the infrastructure. The project will increase access to a safe, climate-resilient supply of water for the entire population of South Tarawa.



MARSHALL ISLANDS

Convenience store benefits from power supply in Ebeye, Marshall Islands (photo by ADB).

The Marshall Islands has established a 35% greenhouse gas emissions reduction target against a 2010 baseline. Achieving its emission reduction goals will require considerable investment in the power system on the nation's capital, Majuro, which is almost entirely dependent on diesel for power generation and accounts for 72% of national electricity demand.

1

The distribution system of Marshalls Energy Company (MEC) in Majuro is more than 30 years old and was not designed to accommodate renewable energy sources. The system can accommodate no more than 11.8% renewables—well below the national 20% target—without upgrades to the Majuro power plant and distribution network. Furthermore, outdated fuel storage facilities pose critical risks to public safety, fuel security, and economic growth.

ADB is supporting the Marshall Islands to strengthen energy security and modernize outdated power infrastructure. The Capacity Building and Sector Reform for Renewable Energy Investments in the Pacific TA is helping build capacity and strengthen the commercial performance of MEC, while corresponding investments are improving system efficiency, enabling the uptake of new renewable sources of power, and addressing key safety concerns (p. 9).



Status: Active Total financing (ADB): \$2 million

The **Majuro Power Network Strengthening Project** is installing an advanced metering infrastructure, which will allow MEC to manage power more efficiently, decrease network losses, reduce diesel fuel consumption for power generation, and improve revenue collection. Data provided by the advanced metering infrastructure will inform future investments to improve system efficiency and increase the share of renewable energy used to power the grid.

The project is also strengthening MEC's financial sustainability with a comprehensive program for management improvements and business process reengineering. The reform program is targeting key areas such as governance, accounting, and methodologies for setting and approving tariffs. ADB anticipates financing a second phase of the project to replace transformers and conductors, and to further support the uptake of renewable power generation into the grid.



Status: Active Total financing (ADB): \$19.7 million (\$12.7 million and \$7.0 million proposed additional financing)

Majuro houses the largest fuel storage facility in the Central Pacific. A 6 million-gallon fuel tank farm was constructed in 1981 to meet increasing electricity demand. Nearly 4 decades later, the site continues to supply fuel to Majuro, Kwajalein Atoll, and maritime customers (fishing fleets and shipping vessels). However, the facility is in critical need of repair.

The fuel tank farm is located about 30 meters from the ocean, making it extremely vulnerable to atmospheric corrosion. At the same time, constrained funds have contributed to limited maintenance and corresponding degradation of facility equipment. MEC and the government have flagged refurbishments as an urgent investment need to safeguard against potential health, safety, economic, and environmental risks associated with tank floor leaks, pipeline leaks, or catastrophic tank failure.

The **Energy Security Project** is (i) rehabilitating the fuel tank farm and instituting a comprehensive operation and maintenance (O&M) plan, (ii) mitigating key safety and environmental risks associated with the handling and storage of refined petroleum products, and (iii) improving the overall fuel security of the Marshall Islands. Proposed additional financing will enhance the resilience of energy systems in the Marshall Islands to natural disasters, and help strengthen long-term sector performance.

The proposed additional financing will add two outputs to the original project. The new outputs will (i) support MEC to implement a management plan, and (ii) improve disaster resilience of the energy system. Implementing MEC's action plan will support it to provide more reliable and efficient power supply while strengthening its long-term commercial viability. Improvements under the action plan will enhance grid reliability and support the national transition to renewable energy for power generation. Support for improved resilience and disaster risk reduction (DRR) will include (i) replacing electricity system protection components to reduce outages and enhance resilience; (ii) conducting geographic information system mapping of electrical infrastructure to understand its exposure to natural hazard risks and support of evidence-based planning; and (iii) training MEC customers, including women, on distribution code and connection requirements. The additional financing will complement original project activities and improve overall energy security and DRR in the Marshall Islands.



NAURU

Students benefit from energy supply and internet connectivity in Micronesia (photo by ADB).

Nauru is a single isolated island in the South Pacific, with a land area of 21 km² and a population of 13,300 people. Access to grid electricity across Nauru's population is universal. However, electricity supply falls short of demand, and the nation is almost entirely dependent on diesel for power generation, exposing it to fuel price shocks and the risk of power outages if supply is interrupted. All fuel is imported through Nauru's single commercial port, which is vulnerable to severe weather events and the effects of climate change.

Scaling-up renewable energy power generation can greatly improve Nauru's fuel security, in support of a more reliable, affordable, and environmentally sustainable power supply. The Government of Nauru is committed to improving energy security and reducing greenhouse gas emissions, and has established a 50% renewable energy target for power generation by 2020 in the Nauru Energy Road Map, 2018–2020.

ADB has supported Nauru Utilities Corporation (NUC) to improve supply-side energy efficiency, and is helping it leverage efficiency gains to integrate new sources of renewable power into the grid. The project is supporting Nauru to strengthen the utility sector and amend tariff structures to encourage cost recovery and increase NUC's financial sustainability.

Solar Power Development Project

Status: Active Total financing (ADB): \$22 million

The **Solar Power Development Project** will provide a grant under the Pacific Renewable Energy Investment Facility to finance a 6 MW grid-connected solar plant and a 2.5 MWh/5 MW BESS. The project will reduce Nauru's dependence on fossil fuels for power generation, and decrease its emissions by approximately 11,155 tons of CO₂ equivalent per year. It will also provide capacity building for NUC in the areas of solar plants and BESSs, their integration in the grid, finance and accounting, and gender mainstreaming.





Palau spans more than 340 islands in the North Pacific, and is home to about 18,400 people; almost 80% of the population is concentrated either in the city of Koror or the state of Airai. The country's pristine natural environment has supported a thriving tourism industry, which contributes about 55% of gross domestic product, while development grants under Palau's Compact of Free Association with the United States provide additional economic stimulus. However, impacts of the coronavirus disease (COVID-19) pandemic on tourism will have profound effects on the national economy, as will the scheduled cessation of grant funding under the Compact of Free Association.⁷

Although Palau enjoys a 100% electrification rate, it relies heavily on imported diesel for power generation, and its power infrastructure—including transmission, distribution, and generation assets—is outdated, inefficient, and highly exposed to the effects of climate change. The government has set a 45% renewable energy target for 2025, but will need to overcome substantial technical and financial barriers to achieve it. The state-owned Palau Public Utilities Corporation (PPUC) manages the power system, as well as water and wastewater networks nationwide, and is facing commercial challenges that threaten the national electricity supply.

Palau is confronted with three critical issues in the power sector: (i) infrastructure is in need of significant upgrades to reduce power losses, enhance resilience to climate change, and increase the penetration of renewable sources of energy in the generation mix; (ii) PPUC lacks the financial and technical resources to conduct maintenance on existing assets (let alone upgrade its assets), and the COVID-19 pandemic will place further downward pressures on its financial standing; and (iii) tariff structures and domestic policies do not support cost recovery, contributing to a widening liquidity gap for PPUC. The government has prioritized (i) tariff reforms to introduce market-driven incentives for PPUC's sustainability, and (ii) the leveraging of private investments to meet the country's renewable energy target.

⁷ Palau's Compact of Free Association with the United States is scheduled to end in 2024; however, there are ongoing negotiations that may see it extended or modified.

Palau Public Utilities Corporation Reform Program (Subprogram 1)

Status: Active Total financing (ADB): \$5.0 million

The government recognizes the critical link between economic growth and the need for utility reforms. Improved performance of PPUC will have far-reaching effects on the day-to-day lives of Palau's citizens and the business sector. As the power offtaker, PPUC's sustainability is a prerequisite for private investment in renewable generation. With the expected increase in renewable generation to replace expensive and inefficient diesel generation, PPUC will be able to reduce the cost of its electricity and phase-out subsidies.

The **Palau Public Utilities Corporation Reform Program** will strengthen the corporate governance and financial management of PPUC, and support tariff reforms to enhance its commercial performance. The policy-based loan will improve the commercial performance of the energy sector and pave the way for private investment in renewable power generation. The policy-based lending modality is most appropriate given the long-term requirements for support in the power subsector. It will enable sequenced improvements to the power subsector, and foster greater coordination with key development partners, including the International Monetary Fund.

Box 4: "One ADB" Approach is Supporting Private Sector Renewables in Palau

In Palau, the Pacific Department and the Office of Public-Private Partnership of the Asian Development Bank (ADB) have been working together with the government and Palau Public Utilities Corporation to make private investments in renewable energy possible.

The Office of Public–Private Partnership provided transaction advisory services to support the public utility in structuring a solar photovoltaic project in two phases. In parallel, the Pacific Department supported the regulator, the Palau Energy Authority, to review independent power producer (IPP) proposals, and it also supported the utility to conduct a grid impact study, which will be essential to integrating new sources of renewable energy into the grid. Collaboration between the Office of Public–Private Partnership and the Pacific Department is delivering essential value to the utility and the energy sector as a whole through a comprehensive, phased development approach.

The solar system will be designed, built, financed, operated, and maintained by an IPP, with the first phase anticipated to be operational in 2021. The solar farm will be the first ever built by an IPP in the country, and among the largest IPP renewable energy projects in the region. Support for the solar farm initiative will help assist Palau in meeting national energy targets and transitioning to a cleaner fuel economy.



Box 5: Impacts of COVID-19 on Pacific Power Utilities: Charting the "New Normal"

The Asian Development Bank (ADB) organizes a series of meetings, titled the Pacific Utility CEO Talks, to encourage knowledge sharing among utilities in the region. In June 2020, ADB convened energy sector stakeholders to discuss an urgent topic: the impacts, implications, and local responses to the coronavirus disease (COVID-19) pandemic.

The meeting highlighted the need to recalibrate business models to accommodate an increasingly resource-constrained environment, and flagged the importance of renewable energy generation for increasing fuel security and decreasing generation costs. The meeting also discussed the importance of subsidies for poor and vulnerable groups, and ways in which prepaid meters have helped reduce potential revenue losses from domestic consumers.

COVID-19 Impacts

Demand. The most immediate challenge for Pacific utilities operating in the "new normal" is the steep drop in electricity demand, which is already impacting revenue collection and threatens far-reaching issues in the medium term, including grid instability. Decreased electricity demand is most acute in the tourism economies, where commercial consumers (including hotels) account for as much as 50% of utility business and are heavily impacted by travel bans.

For example, at the height of the lockdowns in April, Fiji experienced a 25% decline in power demand against averages, which gradually improved to a 13% drop in demand during May 2020. Similarly, the utilities in the Marshall Islands and Tonga registered 25% declines in electricity demand, while Palau registered a 20% drop, associated with national lockdowns and the cessation of tourism.

Revenue collection. In addition to decreased power demand, the commercial performance of utilities is threatened by reduced or delayed revenue collection (associated with customers' inability to pay). In power markets with prepaid meters, however, utilities expressed that prepayment helped limit challenges associated with revenue collection, particularly for domestic consumers.

Subsidies and vulnerable groups. Although prepaid meters are helping ensure that utilities collect revenue for the services they provide, there is also a need to support consumers in accessing electricity, and governments across the region will need to account for the costs of subsidies, particularly in the context of economic hardships surrounding COVID-19. In Fiji, for example, as many as 25,000 of the utility's 200,000 customers are classified as vulnerable, and are fully subsidized by the government and utility.

Range of impacts. In some Pacific economies, impacts on utility operations have been relatively muted. For example, Abraham Simpson, former chief executive of Nauru Utilities Corporation said, "Nauru remains connected with weekly flights to and from Australia, and there have been no major impacts on power utility operations, including sales, revenue, and billing. However, there have been delays in the capital works program due to travel restrictions and quarantine requirements for contractors entering the country."

Oil price volatility—and price drops in particular—have had varied effects on utilities and associated businesses across the region. In Papua New Guinea, for example, the oil price drops had considerable positive impacts because of reduced costs of generation. Conversely, the Marshall Islands suffered from reduced demand in its fuel supply business for vessels, but benefited from reduced costs of generation. Other Pacific nations were largely unaffected by lower fuel prices, as they have longer-term supply contracts (often of 6 months) that fix fuel costs.

Utilities Operating in the New Normal

The Pacific island nations are highly exposed to external shocks, including natural disasters and the effects of climate change. The COVID-19 experience has highlighted the need for contingency and resilience planning. While several Pacific utilities had previously developed business continuity plans, these had largely been conceived to address climate risks and the impacts of natural disasters.

Box 5 continued

The pandemic highlights the need to develop and implement comprehensive business continuity plans and, more broadly, to expedite measures to strengthen commercial performance, including tariff reforms and utility restructuring. Utility representatives have emphasized the importance of scaling-up renewable power generation to protect against price volatility and reduce generation costs.

The June 2020 Pacific Utility CEO Talks meeting highlighted that utilities in the region should

- (i) develop or recalibrate business continuity plans to encourage preparedness for both physical disasters and economic shocks,
- (ii) expedite tariff reforms and utility restructuring to recalibrate revenue and expenditures,
- (iii) continue to invest in renewable energy to reduce generation costs and increase fuel security with domestically available resources,
- (iv) establish reserve funds to cope with external shocks,
- (v) encourage private sector participation in the energy sector by reviewing regulations, and
- (vi) extend subsidy programs to provide adequate levels of support to those in need.

Source: ADB. 2020. COVID-19 Impact and Post-Pandemic "New Normal." Policy Note paper prepared following the Pacific Utility CEO Talks meeting. Manila. 5 June.

Disaster Resilient Clean Energy Financing Facility Project

Status: Active

ABD financing: \$3.0 million Japan Fund for Poverty Reduction grant

Since 2012, Palau has experienced several natural disasters, causing cumulative losses of about \$51 million. Given its centralized electricity network and concentrated power supply, Palau's energy assets are the nation's most vulnerable infrastructure to the effects of climate change and natural disasters.⁸ Implementing disaster resilience upgrades, energy efficiency retrofits, and rooftop solar systems for households and buildings can significantly enhance resilience while contributing to national mitigation efforts. Palau's policy environment encourages such upgrades, but lacks financial mechanisms to facilitate their implementation.

The Disaster Resilient Clean Energy Financing Facility Project

will provide a grant to the Ministry of Finance for onlending to eligible households through the National Development Bank of Palau as the financial intermediary. The facility will make disaster-resilient clean energy financing available to eligible households, and increase access to such financing for women and women-run households. Overall, the project will increase the resilience of Palauan communities to climate and disaster risks, reduce energy consumption through energy efficiency upgrades, and increase the number of rooftop solar systems. The project will be the first-ever financial intermediation initiative targeting disaster-resilient clean energy in Palau and the Pacific DMCs as a whole.



⁸ Off-grid power supply is limited to rural areas, and accounts for about 4% of the country's total generation. Most public infrastructure (e.g., hospitals, schools) is connected to the grid with limited emergency or off-grid generation capacity.



Providing more access to reliable electricity can drive economic growth and improve the quality of life across Papua New Guinea (PNG). Currently, about 12% of the total population and only 4% of the rural population are connected to the grid, while outdated transmission and distribution infrastructures lead to frequent outages in urban centers. As PNG's economy and population continue to grow, the government is collaborating with development partners and the private sector to scale-up electrification rates and improve electricity services.

To achieve this, the Government of PNG, through its Department of Petroleum and Energy, has laid out three primary goals in its Electricity Industry Policy 2011. The policy seeks to (i) improve access to electricity, (ii) improve the reliability of electricity, and (iii) ensure that power is affordable for consumers. The government has set the national target of achieving a 70% electrification rate by 2030.

ADB is supporting these efforts with a multitranche financing facility, and a number of TA and lending projects that aim to improve electricity services in urban centers and increase access to electricity in rural areas. These initiatives are improving living conditions and scaling-up economic activity.



The **Town Electrification Investment Program** comprises two tranches, and is improving power supply in provincial urban centers by supplanting high-cost diesel generation with renewable energy sources, and extending the distribution network to more communities.

Town Electrification Investment Program, Tranche 1

Status: Active ADB financing: \$52.64 million Cofinancing: \$4.77 million Total financing: \$57.41 million

Tranche 1 comprises three subprojects and is being implemented to (i) construct transmission lines to connect provincial centers, (ii) replace diesel generators with hydropower plants, and (iii) build stakeholder capacity to support project sustainability. Activities include the following:



150 kilometers of 66-kilovolt transmission lines from Bialla to Kimbe in West New Britain province completed in December 2017



Construction of the **3 MW Divune hydropower plant** began in July 2017



The utility, PNG Power, and project beneficiaries received capacity building and gender training



Rehabilitation of the 0.8 MW Ruu Creek and 1.5 MW Lake Hargy hydropower plants


Town Electrification Investment Program, Tranche 2

Status: Active Total financing (ADB): \$45.97 million

Tranche 2 is refurbishing two existing hydropower plants that are currently operating below their nameplate capacities. Rehabilitating the two aging hydropower plants will extend their economic life by 20–25 years each, and ensure that they meet current international operating standards. Upon project completion, the Yonki Toe Dam hydropower plant will operate at its rated capacity of 18 MW and the Warangoi hydropower plant will operate at its rated capacity of 10 MW.

The investment program's overall improvements to grid connectivity and rural electrification will contribute to its impact of improved economic conditions of the population in the targeted provincial centers not connected to the main grids, and its outcome of improved utilization of reliable and clean power to two provincial urban centers.



Status: Active Total financing (ADB): \$65.24 million

Access to electricity is essential for inclusive socioeconomic growth. However, thousands of communities across the Pacific still lack basic grid infrastructure and can access electricity for only a few hours a day at best. PNG is one of the most underserved countries in the Pacific region in terms of energy access. Improving power supply in urban centers will play an important role in driving PNG's economic growth.

PNG's capital, Port Moresby, has experienced a steady increase in electricity demand. This growth, paired with poorly maintained transmission and distribution infrastructure, has led to increased power outages. The Port Moresby grid has historically been supplied by renewable energy from the 60 MW Rouna Cascade hydropower plant. However, degradation of this system— because of heavy demand and inadequate maintenance—has led to unreliable power supply and increased dependence on diesel for generation. Renovating the existing renewable energy generation assets and improving the transmission and distribution infrastructure are essential in supporting the capital's growing economy and population.

The **Port Moresby Power Grid Development Project** is addressing these needs by (i) rehabilitating two existing hydroelectric plants (Rouna 1 and Sirinumu), (ii) constructing a new substation and 66-kilovolt transmission line for Kilakila, (iii) improving Port Moresby's transmission and distribution infrastructure, and (iv) providing project management support and capacity building.

The project is enhancing energy efficiency and will provide improved access to renewable power. It will produce an outcome of better power supply for Port Moresby, and deliver the impact of increased economic activity among grid-connected residential and commercial consumers.



Status: Completed in 2019 Total financing (Cofinancing): \$2.5 million

The Government of New Zealand and the Japan Fund for Poverty Reduction helped to extend the outcome of the Town Electrification Investment Program by increasing access to electricity and supporting community development in rural areas. The \$5 million grant for **Improved Energy Access for Rural Communities** helped address remaining poverty and inequality, improve the quality of life, and create new opportunities for livelihoods in remote areas in PNG.

The grant provided electricity to about 25,000 new users, extending power distribution to 5,000 households, 20 schools, and 20 medical facilities in rural areas. To help leverage social and economic benefits linked to energy access, the grant supported community-training initiatives that helped families identify new opportunities for income generation, while teaching energy efficiency, household budgeting, and electricity safety.

The project used community-based civil works contracts to engage local stakeholders in the construction and maintenance of new transmission and distribution assets. It was envisioned that the utility, PNG Power Limited, would issue a total of 426 contracts in three provinces, which would benefit an estimated 5,579 participants with income-generating opportunities. Approximately 42% of the beneficiaries were envisioned to be women.



Status: Proposed Total financing (ADB): \$212 million Cofinancing: \$62 million Total financing: \$274 million

ADB is assisting PNG to significantly increase the national electrification rate, using renewable sources of power. The proposed **Power Sector Development Project** will increase the national electrification rate from 12% to 19% by 2028.

The project will (i) strengthen and expand the transmission and distribution network, (ii) enhance the capacity of PNG Power Limited's monitoring system, and (iii) provide institutional support and capacity building for a range of power sector stakeholders. The project will improve socioeconomic conditions by providing reliable power services to the people of PNG.





Samoa comprises nine islands, with about 95% of its population (197,000 people) living on the two main islands of Savaii and Upolu. As peak electricity demand grows at about 3% annually, Samoa's Electrical Power Corporation (EPC) is tasked with ensuring sufficient generation and transmission capacity, while improving the quality and reliability of electricity supply. EPC is working to diversify Samoa's energy mix in line with the national target of generating 100% of power with renewable energy by 2025. Samoa's power grid serves 95% of the total population, with the remainder generating electricity from small diesel or solar systems. Overall, the energy sector is well governed, and domestic stakeholders are working to attract private sector involvement in the clean energy sector, with support from ADB.

Renewable Energy Development and Power Sector Rehabilitation Project

Status: Active ADB financing: \$19.21 million Cofinancing: \$7.55 million Total financing: \$26.76 million

The **Renewable Energy Development and Power Sector Rehabilitation Project** is supporting Samoa's energy sector by increasing power generation from renewable energy sources, repairing damage to power infrastructure caused by Cyclone Evan (which struck in 2012), and increasing the power sector's resilience to future natural disasters.

The project is assisting EPC to rehabilitate and reconnect 4.69 MW of hydropower capacity to the grid, and to build and connect an additional 3.3 MW of hydropower to the network. The amount of the new hydropower plant capacity changed with the addition of the Fuluasou small hydropower plant and the cancellation of the Faleaseela small hydropower plant, and the project also installed a third 2 MW generator at Taelefaga. The project's outcome will be a higher share of electricity generated by hydropower, and its impact will be greater energy security. ADB is supporting training and knowledge-sharing activities to help ensure long-term project sustainability with enhanced institutional capacity.

Solar Power Development Project

Status: Active ADB financing: \$2 million Cofinancing: \$1 million Total financing: \$3 million

Since 2010, Samoa has promoted private sector investment in its renewable energy sector, and has successfully attracted three IPPs to introduce solar systems, which account for about 5% of the national installed capacity.

Sun Pacific Energy Limited (SPEL) is one of the three IPPs and commissioned its 2.2 MW solar plant in 2015. The plant generates 3.5 million kWh per year, and sells the power to EPC under a 20-year power purchase agreement. In 2017, SPEL and EPC signed an addendum to the power purchase agreement, allowing for an expansion of the plant and sales of up to 6.1 million kWh per year.

Accessing long-term credit in the Pacific is difficult for local entrepreneurs, and the lack of private sector finance restricts growth in the renewable energy sector.

The **Solar Power Development Project** is the first renewable energy project that is being developed as an IPP and seeking debt financing in Samoa. ADB's assistance will ease access to credit and support private sector participation in the Pacific energy sector. The investment expanded the SPEL solar farm to a total of 4.4 MW, which is anticipated to produce at least 5.5 million kWh per year for 20 years. The project is lowering the cost of generating electricity, reducing emissions by an estimated 1,644 tons of CO₂ per year, and improving fuel security in Samoa.

Box 6: Scaling-Up Private Investment in Energy Sectors across the Pacific

Development partners will continue to play a critical role in financing energy sector transformation across the Pacific. However, in order for the Pacific developing member countries to achieve their ambitious renewable energy targets, the private sector will need to play a greater role in generating power and operating energy infrastructure. As renewable energy projects become more commercially viable across the region, the private sector is increasingly capable of filling investment gaps.

The Asian Development Bank (ADB) is playing a central role in facilitating the uptake of more clean energy projects by the private sector. It is helping accomplish this by (i) supporting the development of more effective business enabling environments through the Pacific Private Sector Development Initiative; (ii) making direct investments in clean energy projects or project developers through ADB's Private Sector Operations Department; and (iii) delivering private sector support mechanisms, including risk guarantees and targeted support for financial institutions that provide onlending for clean energy investments.

The Solar Power Development Project in Samoa (p. 33) draws financing from ADB's Private Sector Operations Department, alongside deep regional experience from ADB's experts in the Pacific Department. ADB will continue to invest in bankable energy projects while promoting internal collaboration to achieve results at a greater scale. ADB will also increasingly work with private sector stakeholders (including financial institutions) to scale-up access to commercial finance in the clean energy sector. The Pacific Private Sector Development Initiative will play an increasingly important role in helping to strengthen business environments across the region, and to support matchmaking between public and private entities with shared interests. ADB's involvement in these ways will enable it to increasingly deliver finance to the region through the Private Sector Operations Department while also encouraging the participation of external sources of private finance in energy sectors across the Pacific.





Status: Proposed ADB financing: \$65.7 million Cofinancing: \$19.0 million Total financing: \$84.7 million

The Vaisigano River is the largest river in Samoa, and plays a crucial role in meeting 60% of the drinking water needs for the 50,000 people living in the capital, Apia. Extreme weather events have caused major flooding of the Vaisigano River, impacting public and private properties along the waterway. Furthermore, the river's catchment has very steep slopes, which increases the risk of rapid floods following heavy rain. The river is susceptible to both flooding and drought, which threaten drinking water supplies and impact Samoa's resilience to climate change.

The **Alaoa Multipurpose Dam Project** will construct a 55-meter-high dam with an estimated storage capacity of 4.0 million cubic meters of water to prevent flooding and support seasonal water supply. The project will also construct a 0.60 MW run-of-river hydropower plant.

The project will (i) address disaster resilience by helping prevent floods, (ii) support climate change adaptation by providing a reliable water supply during drought, (iii) improve Samoa's fuel security by installing a new source of renewable energy for power generation, and (iv) reduce biosecurity risks while facilitating regional cooperation. The project will support climate change adaptation measures and reduce Samoa's dependence on diesel imports for power generation.

SOLOMON ISLANDS

People benefit from energy supply in Honiara (photo by ADB).

Solomon Islands consists of 6 major islands and nearly 1,000 smaller islands covering a land area of about 28,000 km². About 16% of Solomon Islands' 670,000 residents are connected to the electricity grid, and nearly all grid-connected power is generated by diesel. The Solomon Islands National Energy Policy targets increasing the urban electrification rate to 80% and the rural rate to 40% by 2025. The policy also seeks to increase the share of renewable energy used to generate electricity from 2% in 2018 to 50% by 2035.

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Status: Active ADB financing: \$30.0 million Cofinancing: \$175.5 million Total financing: \$205.5 million

The **Tina River Hydropower Project** is increasing the share of renewable energy supplying Honiara's electricity grid, leading to a corresponding decrease in the cost of power generation in the nation's capital. The 15 MW hydropower system underpins a paradigm shift in power generation for Solomon Islands.

Once complete, the plant is expected to meet about 68% of Honiara's projected electricity demand. This will provide sufficient flexibility to the power system to permit further integration of renewable energy, without the need for additional battery storage systems. Successful commissioning of the plant will contribute an estimated savings of 49,500 tons of CO_2 equivalent per year—more than twice Solomon Islands' commitment in its Intended Nationally Determined Contribution under the United Nations Framework Convention on Climate Change.



Status: Active ADB financing: \$2.24 million Cofinancing: \$6.20 million Total financing: \$8.44 million

The **Solar Power Development Project** is supporting the installation of renewable energy in Solomon Islands to (i) decrease the cost of generating electricity by replacing diesel generation with less expensive solar power and (ii) reduce greenhouse gas emissions.

The project is installing a total of 2 MW of grid-connected solar power and building the capacity of Solomon Power staff, specifically in the O&M of small grid-connected hybrid solar systems. A total of five solar-diesel hybrid systems will be installed at different sites, and will replace 66%–87% of diesel generation in the five provinces of Kirakira (320 kW), Lata (290 kW), Malu'u (140 kW), Munda (1,000 kW), and Tulagi (250 kW). The project is also installing battery systems to allow higher penetration rates of intermittent solar power.

New electricity connections will allow students in these communities to access computers, thereby enhancing the quality of education with improved resource availability. Solar power will also allow remote hospitals and medical facilities to refrigerate and store medicine. The project's outcome will be increased supply of clean, reliable power, and its impact will be increased utilization of renewable energy.





Tonga comprises 171 islands spread over the five island groups of 'Eua, Ha'apai, Niuas, Tongatapu, and Vava'u. Although 89% of households enjoy access to grid electricity, Tonga is heavily dependent on imported fuel, with about 90% of power generation coming from diesel. Increasing the share of renewable energy used to generate power, and improving supply-side energy efficiency can dramatically lower generation cost, enhance Tonga's energy security, and decrease emissions.

In addition to supply-side improvements in the power sector, there is an urgent need for Tonga to build resilience to the effects of climate change. Its placement along the tropical cyclone belt and the Pacific Ring of Fire makes Tonga the second most vulnerable country in the world to natural hazards (behind its Pacific neighbor, Vanuatu). Cyclones Ian (2014) and Gita (2018) caused cumulative damage in excess of \$200 million, with infrastructure reconstruction needs concentrated in the energy sector.

ADB is supporting Tonga to reconstruct assets using a "build back better" approach to safeguard infrastructure against natural hazards in the future. Assistance is also increasing Tonga's renewable energy generation capacity, strengthening grid infrastructure, and supporting the nation to achieve a more resilient development pathway.



Status: Active Total financing (ADB): \$6.8 million

The **Cyclone Gita Recovery Project** is reconstructing and upgrading priority sections of the electricity network in Nuku'alofa damaged by Tropical Cyclone Gita in February 2018. The assistance package leverages ADB's comparative advantage supporting power sector improvements and reconstruction activities in Tonga, and will deliver a safer, more reliable power network for the capital.

The project is restoring access to reliable electricity supply and will make the network more resilient to future storms. It is rehabilitating the existing high-voltage and low-voltage overhead network using disaster resilience measures, and installing new underground cable connections. The build back better approach takes into account opportunities to climate- and disaster-proof new assets, and network upgrades will form part of ongoing reconstruction efforts in Nuku'alofa, which will rebuild the city to a higher standard of disaster resilience.

😫 🕂 Outer Island Renewable Energy Project

Status: Proposed ADB financing: \$13.97 million Cofinancing: \$14.11 million (including the proposed \$1.91 million additional cofinancing) Total financing: \$28.08 million

The Tonga Energy Road Map 2010–2020 sets out the government objectives to improve energy efficiency and increase the renewable energy share of electricity generation to 50% by 2020 and to 70% by 2030. The **Outer Island Renewable Energy Project** is supporting this goal by constructing solar generation systems on eight of Tonga's outer islands, and upgrading the network on one outer island, with a total preliminary capacity of 1.32 MWp.

The project is helping Tonga to build photovoltaic systems into both existing grids and new grids, rehabilitate and improve energy efficiency among distribution networks, and install photovoltaic systems into community-owned mini-grids. The project is also building human and institutional capacity in the O&M of solar power and integrated diesel systems. Additional financing will help upgrade about 100% of the electricity grid on Vava'u.

The subprojects include the following:



- **On-grid.** Connecting photovoltaic generators to existing electricity distribution networks on 'Eua (0.2 MWp) and Ha'apai (0.55 MWp), and repairing systems on Vava'u.
 - **Mini-grid.** Connecting photovoltaic generators to existing community-owned and community-managed mini-grids on four Ha'apai outer islands, including Ha'ano (70 kWp), Ha'afeva (150 kWp), Nomuka (70 kWp), and 'Uiha (100 kWp).
 - **Off-grid.** Expanding existing solar home system capacity in Niuafo'ou and Niuatoputapu (additional 0.18 MWp).
- **Energy efficiency.** Upgrading 100% of existing power distribution networks on 'Eua and Vava'u.

Once complete, the solar systems will supply environmentally sustainable power to households, schools, and other public facilities on the Ha'apai island group;⁹ and the islands of 'Eua, Vava'u, and Niuatoputapu—the project will also provide solar home systems on Niuafo'ou. The project is providing business skills training on income-generating opportunities for beneficiary communities, with at least a 50% female participation rate. The project is also supporting women to engage in project activities by mainstreaming gender components into the contracting for civil works, as well as into capacity building for the utility.

The project is increasing access to more affordable electricity (generated by renewable energy resources) and is designed to serve as a scalable model for replication. It is producing the sustainable impact of reduced dependence on imported fossil fuel for power generation.

⁹ The project covers the main island of Lifuka, as well as the four outer islands of Ha'afeva, Ha'ano, Nomuka, and 'Uiha of the Ha'apai island group.

😫 🕂 💽 Tonga Renewable Energy Project

Status: Active ADB financing: \$12.2 million Cofinancing: \$32.4 million Total financing: \$44.6 million

The **Tonga Renewable Energy Project** delivers funds from the Pacific Renewable Energy Investment Facility to help Tonga rapidly transition to cleaner forms of power generation while increasing access to electricity for communities on the outer islands. The project also enables private sector investment in renewables by integrating battery storage into the grid to absorb intermittent solar and wind power (Box 7). The project is helping increase access to clean, resilient, and affordable sources of energy for the people of Tonga, and will reduce the nation's dependence on fossil fuels for power generation.

The project is installing 650 kW of grid-connected solar photovoltaic capacity with 1.4 MWh of battery storage on the islands of 'Eua and Vava'u, and mini-grids totaling 501 kW of photovoltaic capacity with 4.3 MWh of battery storage on the five outer islands of Kotu, Mo'unga'one, Niuafo'ou, O'ua, and Tungua. To absorb an additional 22 MW of solar and wind systems to be funded by IPPs, the project is also installing the country's first large-scale BESS in the capital, Nuku'alofa. The batteries, with a total capacity of 19.9 MWh, will store excess renewable energy to supply demand when the sun is not shining.

This smart use of BESS will enable Tonga to increase renewable energy penetration up to 50% nationwide without negatively affecting the island grids. The project will avoid more than 13,000 tons of CO_2 equivalent emissions annually. The project will also deliver capacity building, which will help Tonga transition to cleaner sources of power, in order to reduce reliance on imported fossil fuels and encourage private investment in renewable energy.



Box 7: Renewable Energy Project: Accelerating Gender Equality and Private Sector Participation with Renewable Energy Investments

Women are an indispensable part of the workforce, but they face disproportionate barriers to accessing high-quality jobs in many of the Pacific developing member countries. Energy sector operations of the Asian Development Bank (ADB) are creating opportunities for women in the Pacific to engage in the workforce and to participate in decision-making structures, both in the formal and informal economies.

Energy sector projects across the Pacific are contributing to a higher participation rate of women in nontraditional jobs, including technical roles such as installing and maintaining solar, wind, and hydroelectric power generation plants. Technical assistance and lending activities are providing targeted training to mainstream gender considerations into government institutions and utilities, as well as training women in specialized skills to participate in the energy sector. ADB's work with Tonga Power Limited (TPL), the country's sole energy provider, is promoting the involvement of women in the workforce.

Laura Lolohea started her training with TPL in 2010 as a line mechanic and has been a staff member since 2013. Her job involves climbing electricity poles to connect power lines to houses, doing repairs, and installing meters. Laura says in her experience, TPL encourages and supports women to pursue work as line mechanics and in other roles predominantly filled by men in Tonga's power sector. Since hiring Laura, TPL has engaged more female technical staff, who now account for about 10% of the workforce. TPL says it is creating more long-term employment opportunities for women in keeping with the utility's commitment to invest in a healthy, well-trained, and gender-diverse workforce.

Laura says working in the power sector has taught her a lot. "When I first started in this male-dominated working culture, I was the only female line mechanic," she said. "I managed to break the norm that says women cannot do this work by asking a lot of questions and learning from my male colleagues, who were always inclusive." ADB works to ensure that tendering and civil works contracts provide equal opportunities for men and women, and that they receive equal compensation for work. A total of 10 energy sector projects in the Pacific are categorized *effective gender mainstreaming* or have *some gender elements*, indicating that the project is designed to support more equitable and inclusive sector development.

In addition to supporting the participation of women in nontraditional roles in the workforce, ADB's work in Tonga is helping scale-up private sector involvement in the energy sector. The Renewable Energy Project, in particular, is taking steps to ensure the private sector can finance additional renewable energy generation. First, to accomplish this, the project is financing a large amount of battery storage, which will enable the grid in the nation's capital to accept new intermittent sources of power. Second, the project is providing training to TPL to ensure staff are capable of managing complex, mixed renewable energy systems, including both solar and wind assets. Third, the project is supporting TPL to work with independent power producers on structuring bankable power purchase agreements that will enable the private sector to finance new wind generation capacity. The project will blend public and private sector interests to dramatically scale-up renewable power generation in Tonga, ultimately supporting Tonga to reduce fuel consumption by about 4.17 million liters per year and reduce emissions by about 13,616 tons of carbon dioxide equivalent over the project's 25-year life cycle.

ADB's support for private sector involvement in Tonga's energy sector brings together resources from across the bank, leveraging the "One ADB" approach. The following figure shows how ADB's Pacific Department is collaborating with its Private Sector Operations Department to drive robust transformation across Tonga's energy sector. Collaboration through the One ADB approach in Tonga will lead to the development of a 6-megawatt solar project, which will help reduce electricity tariffs from \$0.036 per kilowatt-hour to \$0.11 per kilowatt-hour and reduce emissions by about 6,125 tons per year.

continued on next page



ADB = Asian Development Bank, BESS = battery energy storage system, EGM = effective gender mainstreaming, IPP = independent power producer, kWh = kilowatt-hour, MW = megawatt, PARD = Pacific Department, PPA = power purchase agreement, PREIF = Pacific Renewable Energy Investment Facility, PREP = Pacific Renewable Energy Program, PSDI = Pacific Private Sector Development Initiative, PSOD = Private Sector Operations Department, PV = photovoltaic, RRP = report and recommendation of the President, SGE = some gender elements, TREP = Tonga Renewable Energy Project.

- ^a ADB. May 2017. Pacific Renewable Energy Infrastructure Facility. Manila.
- ^b ADB. Nov 2018. Pacific Tonga Renewable Energy Project. Manila.
- ^c ADB. Apr 2019. Pacific Renewable Energy Program. Manila.
- ^d ADB. Nov 2016. PREIF: PPTA Report. Manila.
- ^e RRP in process.
- Source: ADB.



Tuvalu is a small island developing state with a population of about 11,000 people spread across eight islands. Although 98% of households have access to electricity, Tuvalu is highly dependent on diesel fuel for power generation. Similar to its Pacific island neighbors, Tuvalu's distance from major economies leads to high import prices for fuel and exposure to fluctuating market prices. Increasing the use of renewables for power generation can cause a paradigm shift in the nation's energy security.

Tuvalu has set the target of using 100% renewable energy for power generation by 2025. However, the current share of renewable energy in the fuel mix of the capital, Funafuti, is only 16%. The government is seeking to transition the outer islands from 60% to more than 90% renewable energy for power generation and, subsequently, to concentrate efforts on Funafuti.

Increasing Access to Renewable Energy Project

Status: Active ADB financing (ADB): \$6 million

The **Increasing Access to Renewable Energy Project** is scaling-up the installed peak capacity of solar generators on three outer islands, adding BESSs and new solar capacity to the grid in Funafuti, and building institutional capacity in the areas of financial management, O&M for the new assets, and social and environmental safeguards. The project will install the following:



The project will increase the use of renewable energy to provide reliable access to clean power. The combined activities are expected to displace 6.7 million liters of diesel fuel and avoid 17,800 tons of CO_2 equivalent in greenhouse gas emissions over its lifetime, and support Tuvalu to achieve close to its target of 100% renewable energy for power generation by 2025.

VANUATU

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Bauerfield International Airport in Port Vila, Vanuatu. The airport serves as a hub for Air Vanuatu, the country's flag carrier airline (photo by ADB).

Vanuatu is an archipelago with a population of 297,000 people spread across 84 volcanic islands in the West Pacific. It is ranked the most vulnerable country in the world to natural disasters and the effects of climate change. With a national electrification rate of 33%, the government has prioritized increasing access to electricity to drive sustainable economic growth. The Vanuatu National Energy Road Map sets the targets of achieving a 75% electrification rate and 65% renewable energy share of the generation mix by 2020.

The power sector is operated by two private utilities, which manage government-owned assets. Vanuatu Utilities & Infrastructure Limited operates the Luganville electricity concession on Espiritu Santo (the largest island), and Union Electrique du Vanuatu operates concessions on Efate, Malekula (the second largest island), and Tanna. ADB is supporting Vanuatu to increase access to electricity on the two largest islands, and helping supply baseload with renewable power.



Status: Proposed ADB financing: \$11.0 million (\$5.0 million and \$6.0 million proposed additional financing) Cofinancing: \$7.0 million Total financing: \$18.0 million

The **Energy Access Project** is installing a 400 kW run-of-river hydropower plant, which will supply more than 90% of all electricity generated for the Malekula grid through 2040. The project is also extending grid infrastructure, including 21 kilometers of transmission lines and 79 kilometers of distribution network, on Vanuatu's two largest islands to connect an additional 1,050 households to the grid, increasing the electrification rate from 8% to 14% on Malekula, and from 22% to 29% on Espiritu Santo. Proposed additional financing will enhance the technology used for the transmission and distribution system from a single-wire earth return system to a three-phased system. The benefits of the change in technology include avoided costs of later upgrades or construction as electricity demand grows, reduced inventory costs (resulting from a uniform system), and improved public safety.

In addition to physical improvements to the grid, the project is training newly connected households in electricity-based income-generation opportunities, electricity safety, and household budget management. Overall, the project will deliver a clean supply of electricity to households on Espiritu Santo and Malekula, increase opportunities to generate income, and improve quality of life.

Pacific Energy Update 2020

The *Pacific Energy Update* series provides an annual review of ADB's technical assistance, grant, and lending activities in the region. It showcases the impacts and outcomes of ongoing and recently completed initiatives as of December 2020, and describes select projects slated for implementation in the years to come.

About the Asian Development Bank

ADB is committed to achieving a prosperous, inclusive, resilient, and sustainable Asia and the Pacific, while sustaining its efforts to eradicate extreme poverty. Established in 1966, it is owned by 68 members —49 from the region. Its main instruments for helping its developing member countries are policy dialogue, loans, equity investments, guarantees, grants, and technical assistance.

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