CONTENTS

Foreword iv
Acknowledgments v
ADB Energy Operations in the Pacific vi
Abbreviations viii
Overview 1
Regional Initiatives 5
Country Context and Assistance 10
Cook Islands 11
Federated States of Micronesia 13
Kiribati 16
Marshall Islands 18
Nauru 20
Palau 21
Papua New Guinea 25
Samoa 28
Solomon Islands 30
Tonga 32
Tuvalu 35
Vanuatu 36

TABLES AND BOXES

TABLE
1 Country Data 2
2 Energy Targets and Indicators 3

BOXES
1 Beyond Business as Usual: Pacific Resilience in the Face of Global Uncertainty 4
2 Overcoming Shocks: Resilience and the New Normal for Pacific Energy Systems 8
3 Sustainable Energy Services: Capacity, Governance, and Delivering Clean Electricity 15
4 Leveraging the One ADB Approach to Scale Up Private Sector Participation Across Pacific Energy Sectors 22
5 Innovation Hub: Charting the Way to the “Next Normal” 37
FOREWORD

Welcome to the 2021 edition of the Pacific Energy Update of the Asian Development Bank (ADB). ADB partners with governments, communities, and the private sector to increase access to electricity generated by clean and renewable sources of energy. 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 2021 and describes select projects slated for implementation in the years to come. The Pacific Energy Update 2021 marks an important milestone for ADB’s engagement in the Pacific energy sector, as we begin implementing our new strategic framework, the Pacific Approach, 2021–2025.

Recognizing the evolving needs of our member countries in the region and reflecting on the recent trials brought on by the coronavirus pandemic, our operations in the region will increasingly focus on enhancing resilience in the face of global uncertainty. Our assistance to Pacific energy sectors is helping build resilience to external shocks, improve sustainable service delivery, expand access to renewable energy, and support private sector growth. Through these avenues, ADB’s Pacific energy sector operations are strengthening energy security and climate resilience, reducing emissions, and paving the way for a more prosperous Pacific community.

Leah Gutierrez
Director General
Pacific Department
Asian Development Bank
ACKNOWLEDGMENTS

Preparation of the Pacific Energy Update 2021 was led by Eun Young So (Energy Specialist, Pacific Energy Division) with guidance from Mukhtor Khamudkhanov (Director, Pacific Energy Division) and contributions from Pacific Department colleagues and consultant Roble P. Velasco-Rosenheim. Cecilia C. Caparas oversaw the publication process, and Albert Julian coordinated inputs throughout. A special thanks to all contributors, including those quoted directly in the report.

For more information, please contact the Energy Team, Pacific Department, Asian Development Bank.

Mukhtor Khamudkhanov, Director
mkhamudkhanov@adb.org

Rafayil Abbasov, Energy Specialist
rabbasov@adb.org

Maria Regina Arquiza, Operations Assistant
mpanolarquiza@adb.org

Peter Baum, Energy Specialist
pbaum@adb.org

Faith Joy Buentipo, Senior Operations Assistant
fbuentipo@adb.org

Marie Remilynn Dandan, Associate Administrative Coordinator
mdandan@adb.org

Aivy Katherine Dizon, Project Analyst
adizon@adb.org

Elmar Elbling, Infrastructure Specialist
eelbling@adb.org

Jane Fantilanan, Associate Project Analyst
jfantilanan@adb.org

Alexandra Sybille Galperin, Senior Disaster Risk Management Specialist
algalperin@adb.org

Len George, Principal Energy Specialist
lgeorge@adb.org

Pivithuru Indrawansa, Senior Project Officer (Infrastructure)
pindrawansa@adb.org

Albert Julian, Administrative Assistant
ajulian1.contractor@adb.org

Woo Yul Lee, Senior Energy Specialist
wylee@adb.org

Teresita Leono, Associate Project Officer
tleono@adb.org

Noelle O’Brien, Principal Climate Change Specialist
nobrien@adb.org

Fred Ramos, Project Officer (Energy)
framos@adb.org

Takeshi Shiihara, Senior Energy Specialist
tshiihara@adb.org

Eun Young So, Energy Specialist
eyso@adb.org

Cinderella Tiangco, Principal Energy Specialist
ctiangco@adb.org

Hanna Uusimaa, Senior Climate Change Specialist
huusimaa@adb.org

Ranishka Wimalasena, Energy Specialist
rwimalasena@adb.org
ABBREVIATIONS

ADB – Asian Development Bank
BESS – battery energy storage system
CO2 – 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
PIC-12 – 12 small Pacific Island countries
PNG – Papua New Guinea
SP EL – Sun Pacific Energy Limited
TA – technical assistance
TPL – Tonga Power Limited

WEIGHTS AND MEASURES

km² – square kilometer
kW – kilowatt
kWh – kilowatt-hour
kWp – kilowatt peak
MW – megawatt
MWp – megawatt peak
OVERVIEW

The Pacific region faces a unique set of energy challenges. Its limited supply of fossil fuels 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 costs of power, transmission and distribution losses, and low electrification rates. Crucially, the Pacific island countries are among the most exposed nations, globally, to the effects of climate change—yet many lack the resources and capacity to respond to external shocks.

The work of the Asian Development Bank (ADB) in Pacific energy sectors is helping countries prepare for and respond to these pressing issues. Energy sector operations in ADB’s Pacific developing member countries (DMCs) focus on building energy security, climate change resilience, mitigation and adaptation, and identifying new solutions to drive systemic and lasting change.1

Projects and technical assistance (TA) are financing new renewable power generation, supply-side energy efficiency, grid upgrades, and battery energy storage systems (BESS) to help absorb renewable energy from intermittent sources of power. In addition, ADB is supporting domestic and regional stakeholders to improve sector governance, sustainability, regulation, and management. It is also helping the Pacific DMCs engage meaningfully with the private sector.

To date, ADB and the Pacific DMCs have made considerable progress in improving the quantity and quality of energy services, while also reducing greenhouse gas emissions. The transition to cleaner, more efficient power is reducing dependency on imported fuels, increasing access to affordable and reliable electricity, and supporting climate change mitigation by reducing carbon dioxide (CO₂) 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.

This report discusses how ADB’s partnership with the Pacific DMCs is overhauling energy systems in support of resilient, low-carbon economic growth. The Regional section discusses approaches that ADB is implementing across the Pacific to support deeper collaboration among countries, development partners, and the private sector. The Countries section takes a detailed look at individual initiatives in each of the Pacific DMCs, including both investing and TA activities. Overall, the Pacific Energy Update series is intended to support knowledge sharing and deeper collaboration between ADB, its Pacific DMCs, development partners, and private sector stakeholders engaged in the energy transformation across the region.

---

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

<table>
<thead>
<tr>
<th>DMC</th>
<th>Population* 2020</th>
<th>Land area (square km)*</th>
<th>Exclusive Economic Zone (square km)*</th>
<th>Geography (No. of islands)*</th>
<th>% RE Installed Capacity</th>
<th>Fuel Imports</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cook Islands</td>
<td>17,564</td>
<td>237</td>
<td>1,960,027</td>
<td>14 islands</td>
<td>27.7</td>
<td>18.40</td>
<td>4.92</td>
<td></td>
</tr>
<tr>
<td>Fiji</td>
<td>896,445</td>
<td>18,333</td>
<td>1,282,978</td>
<td>320 islands, 106 inhabited</td>
<td>59.4</td>
<td>442.15</td>
<td>8.39</td>
<td></td>
</tr>
<tr>
<td>Kiribati</td>
<td>119,449</td>
<td>811</td>
<td>3,441,810</td>
<td>32 widely scattered atolls</td>
<td>30.4</td>
<td>10.96</td>
<td>5.89</td>
<td></td>
</tr>
<tr>
<td>Marshall Islands</td>
<td>59,190</td>
<td>181</td>
<td>1,990,530</td>
<td>34 islands, mostly atolls</td>
<td>5.3</td>
<td>24.75</td>
<td>11.90</td>
<td></td>
</tr>
<tr>
<td>Micronesia, Federated States</td>
<td>115,023</td>
<td>701</td>
<td>2,996,419</td>
<td>607 islands</td>
<td>9.5</td>
<td>31.62</td>
<td>8.71</td>
<td></td>
</tr>
<tr>
<td>Nauru</td>
<td>10,824</td>
<td>21</td>
<td>308,480</td>
<td>single island</td>
<td>4.7</td>
<td>10.85</td>
<td>9.60</td>
<td></td>
</tr>
<tr>
<td>Niue</td>
<td>1,626</td>
<td>259</td>
<td>316,584</td>
<td>single island</td>
<td>31.1</td>
<td>2.88</td>
<td>9.59</td>
<td></td>
</tr>
<tr>
<td>Palau</td>
<td>18,094</td>
<td>444</td>
<td>603,978</td>
<td>596 islands, 12 inhabited</td>
<td>3.8</td>
<td>36.64</td>
<td>12.90</td>
<td></td>
</tr>
<tr>
<td>Papua New Guinea</td>
<td>8,947,024</td>
<td>462,840</td>
<td>2,402,288</td>
<td>over 600 islands</td>
<td>32.2</td>
<td>296.31</td>
<td>1.18</td>
<td></td>
</tr>
<tr>
<td>Samoa</td>
<td>198,414</td>
<td>2,934</td>
<td>127,950</td>
<td>10 islands</td>
<td>47.1</td>
<td>68.97</td>
<td>8.28</td>
<td></td>
</tr>
<tr>
<td>Solomon Islands</td>
<td>686,884</td>
<td>28,230</td>
<td>1,960,027</td>
<td>~1000 islands, 350 inhabited</td>
<td>5.4</td>
<td>72.47</td>
<td>6.63</td>
<td></td>
</tr>
<tr>
<td>Tonga</td>
<td>105,695</td>
<td>749</td>
<td>659,558</td>
<td>176 islands, 36 inhabited</td>
<td>30.5</td>
<td>42.46</td>
<td>8.92</td>
<td></td>
</tr>
<tr>
<td>Tuvalu</td>
<td>11,792</td>
<td>26</td>
<td>749,790</td>
<td>9 atolls</td>
<td>41.7</td>
<td>3.67</td>
<td>8.34</td>
<td></td>
</tr>
<tr>
<td>Vanuatu</td>
<td>307,145</td>
<td>12,281</td>
<td>663,251</td>
<td>&gt;80 islands, 65 inhabited</td>
<td>30.2</td>
<td>35.90</td>
<td>4.08</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>11,495,169</td>
<td>528,047</td>
<td>19,463,670</td>
<td></td>
<td>25.6</td>
<td>1,098</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Subtotal | 1,651,700       | 46,874                | 15,778,404                           | Excluding FIJ and PNG (PIC-12) |

Subtotal | 657,671         | 6,363                 | 13,155,126                           | Excluding FIJ, PNG, SOL, and VAN |

DMC = developing member country, FIJ = Fiji, PNG = Papua New Guinea, PIC = Pacific Island Country, RE = renewable energy, SOL = Solomon Islands, VAN = Vanuatu.
Sources: ADB estimates; Pacific Community, Statistics for Development Division; Vivid Maps. Maps of every country’s Exclusive Economic Zone; Worldometer. Countries in the world by population (2021).
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cook Islands</td>
<td>25</td>
<td>18, 18, 7</td>
<td>100% renewable electricity generation by 2020</td>
</tr>
<tr>
<td>Fiji</td>
<td>18</td>
<td>7, 227, 7</td>
<td>100% access by 2020 and 100% renewable electricity generation by 2030</td>
</tr>
<tr>
<td>Kiribati</td>
<td>9</td>
<td>7, 30.4, 3</td>
<td>Achieve at least 45% reduction of fossil-fuel energy generation by 2025</td>
</tr>
<tr>
<td>Marshall Islands</td>
<td>30</td>
<td>29, 2, 53, 2</td>
<td>20% renewable electricity generation by end of 2020</td>
</tr>
<tr>
<td>Micronesia, Federated States of</td>
<td>29</td>
<td>26, 3, 9.5, 2</td>
<td>50% decrease in diesel imports by 2020 and 30% with at least 95% access</td>
</tr>
<tr>
<td>Nauru</td>
<td>18</td>
<td>17, 1, 4.7, 1</td>
<td>30% increase in efficiency, 50% electricity supply from renewables, and 24/7 grid electricity supply with minimal interruptions by 2020</td>
</tr>
<tr>
<td>Palau</td>
<td>3</td>
<td>2, 1, 31.1, 1</td>
<td>80% renewable energy generation by 2025</td>
</tr>
<tr>
<td>Papua New Guinea</td>
<td>33</td>
<td>32, 1, 3.8, 1</td>
<td>45% renewable energy generation and 35% energy efficiency improvement by 2025</td>
</tr>
<tr>
<td>Samoa</td>
<td>1,037</td>
<td>703, 333, 32.2, 1</td>
<td>70% of households to have access to electricity and efficiency improvement by 2030</td>
</tr>
<tr>
<td>Solomon Islands</td>
<td>60</td>
<td>32, 28, 14, 1</td>
<td>100% renewable electricity generation by 2030</td>
</tr>
<tr>
<td>Tonga</td>
<td>60</td>
<td>64, 4, 5.4, 3</td>
<td>7% of electricity from renewables by 2020</td>
</tr>
<tr>
<td>Tuvalu</td>
<td>25</td>
<td>18, 8, 30.5, 6</td>
<td>50% renewable electricity generation and 100% access</td>
</tr>
<tr>
<td>Vanuatu</td>
<td>5</td>
<td>3, 2, 4.7, 2</td>
<td>100% renewable electricity generation and 100% access</td>
</tr>
<tr>
<td>Total Pacific DMCs</td>
<td>1,702</td>
<td>1,119, 615, 36.1, 56, 411, 17, 76, 56, 164,292</td>
<td>70% of households to have access to electricity and efficiency improvement by 2030</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>1,702</td>
<td>1,119, 615, 36.1, 56, 411, 17, 76, 56, 164,292</td>
<td>100% renewable electricity generation by 2020</td>
</tr>
</tbody>
</table>

**Notes:**
- DMC = developing member country, MW = megawatt, PIC = Pacific Island Country.
- RE = renewable energy.
- % of Installed Capacity:
  - Subtotal PIC = 12: 100%, 66%, 36%, 3%, 2%, 4%, 1%, 1%, 0%
  - Subtotal PIC = 12: 100%, 88%, 23%, 15%, 5%, 2%, 1%
  - Subtotal PIC = 12: 100%, 88%, 23%, 15%, 5%, 2%, 1%
  - Subtotal PIC = 12: 100%, 88%, 23%, 15%, 5%, 2%, 1%

**Sources:**
Box 1: Beyond Business as Usual: Pacific Resilience in the Face of Global Uncertainty

The Pacific developing member countries (DMCs) of the Asian Development Bank (ADB) face a unique set of development challenges. Distance from major markets paired with internal dispersion leads to high costs and poor quality of essential services, including electricity—which constrains economic growth. At the same time, small populations and outward migration to larger economies result in severe capacity shortages in the public and private sectors—affecting the efficiency, effectiveness, and sustainability of assistance in the region.

Crucially, the Pacific DMCs are highly vulnerable to external shocks. All of the Pacific DMCs are small island developing states (SIDS); and although ADB classifies only seven of them as fragile and conflict-affected situations (FCAS), they all experience varying degrees of fragility. Their fragility stems from heightened exposure to climatic and economic shocks, paired with limited resources and capacity to cope with them.

The coronavirus pandemic is one of the most severe shocks to affect the region to date, impacting import and export costs, tourism economies, and demand for utility services. In addition, growing risks associated with climate change—such as cyclones, floods and droughts, king tides, and sea level rise—pose longer-term existential threats to the region as a whole. Consequently, there is an urgent need for the Pacific DMCs to build resilience against future shocks. ADB’s assistance to the region is tailor-made to address the root causes of fragility in the Pacific, while also recognizing the unique operating environments present in each of the Pacific SIDS.

Focusing on Resilience: A Paradigm Shift in ADB’s Assistance Strategies

ADB recognizes that SIDS and FCAS require differentiated approaches to planning and implementing assistance. In June 2021, the ADB Board of Directors endorsed the Pacific Approach 2021–2025, which serves as the country partnership strategy for ADB’s 12 smallest Pacific DMCs. The new strategy will oversee a shift in how ADB delivers assistance to the region, all under a unified goal of supporting a resilient Pacific.

The Pacific Approach advances three new objectives: (i) prepare for and respond to shocks, (ii) deliver sustainable services, and (iii) support inclusive growth. In addition to these objectives, the strategy calls for operational changes in how ADB delivers assistance, such as bringing climate change considerations to the foreground, building local capacity to support the long-term sustainability of essential services, and streamlining procurement to support implementation efficiency in each DMC. The Pacific Approach complements the country partnership strategies for Papua New Guinea and Fiji, both of which emphasize building resilience in the face of crisis, as well as ADB’s FCAS and SIDS Approach paper, which highlights the need for differentiated approaches to implementing assistance.

Energy sector operations in the Pacific are aligned with ADB’s broader Energy Policy, which centers on five operational principles: (i) securing energy for a prosperous and inclusive Asia and the Pacific, (ii) building a sustainable and resilient energy future, (iii) engaging with institutions and framing policy reforms, (iv) promoting regional cooperation to enhance energy security, and (v) cross-sector operations to maximize development.

The remaining boxes in this paper (topics are outlined below) discuss how ADB is leveraging energy sector operations to deliver transformative results for communities across the region, in line with the strategic pillars of the Pacific Approach and other guiding frameworks.

- Overcoming Shocks: Resilience and the New Normal for Pacific Energy Systems
- Sustainable Energy Services: Capacity, Governance, and Delivering Clean Electricity
- Leveraging the One ADB Approach to Scale Up Private Sector Participation Across Pacific Energy Sectors
- Innovation Hub: Charting the Way to the “Next Normal”

REGIONAL INITIATIVES

ADB is committed to supporting the Pacific DMCs in increasing resilience to external shocks while supporting more sustainable and inclusive development across the region. The Pacific DMCs have great potential to strengthen local economies and enhance quality of life as they modernize energy sectors. However, deeper coordination is needed to generate greater economies of scale, and to share knowledge and essential resources in addressing systemic energy challenges.

As the largest development partner in the region, by lending volume, ADB is uniquely positioned to support the Pacific DMCs in pooling resources to improve financial and operational efficiency, sharing lessons, and identifying new opportunities to drive further decarbonization and greater energy security. Regional energy sector initiatives seek to deepen collaboration while increasing access to the knowledge and resources needed to deliver sustainable impacts.

ADB serves both as a knowledge bank and as a key financier for the Pacific DMCs—bringing together domestic stakeholders with development partners and identifying new ways to engage the private sector in cleaner, more resilient growth. ADB’s assistance in the region are empowering people and communities by financing solar, wind, hydropower, and battery energy storage, alongside efficient transmission and distribution lines. Complementary TA initiatives are helping utilities operate more efficiently through legal, policy, regulatory, and institutional reforms. Overall, ADB is supporting the Pacific DMCs in their structural shift toward clean energy while fostering partnerships to enhance resilience and inclusive growth pathways.

Regional Approaches to Infrastructure Development

Pacific Renewable Energy Investment Facility

Status: Active
ADB financing (aggregate ceiling): $200 million
Cofinancing (indicative): $500 million
Total financing (indicative): $700 million

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

The facility is designed to help Pacific DMCs rapidly move from their current energy pathway (which is still largely dependent on fossil fuels) to one that is low-carbon and climate-resilient, and which 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 small-scale 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, and have historically undergone individual approval. By grouping projects into a single facility, ADB and its partners are more capable of sharing knowledge and resources and in turn processing assistance packages more efficiently. Improvements to ADB’s project processing efficiency to date, through the facility, have been significant—with a reduction of 2.5 months 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 support for about 20 renewable energy projects over a 7-year period. To date, it has enabled ADB and partner governments to approve 9 projects in 7 of the PIC-11, with an additional 12 in the pipeline for approval during 2021–2024.

---

2 The PIC-11 comprises the Cook Islands, Kiribati, the Marshall Islands, the Federated States of Micronesia (FSM), Nauru, Palau, Samoa, Solomon Islands, Tonga, Tuvalu, and Vanuatu. ADB is exploring the option to expand the facility to its newest Pacific DMC, Niue, which would enable the facility to cover the PIC-12, in line with the approved Pacific Approach 2021–2025 and as Niue develops its pipeline. The facility provides an aggregate approval by the ADB Board of Directors for $700 million in clean energy projects, under which the ADB President is authorized to approve loans and grants for a range of qualifying small-value renewable energy projects.
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 is also overseeing energy sector reforms, promoting private sector engagement, 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.

**Preparation Floating Solar Plus Projects**

**Status:** Active  
**Total financing (cofinanced):** $2 million

The PIC-12 have extreme land constraints that inhibit construction of renewable energy generation assets. Some of the PIC-12 are simply too small to accommodate utility-scale solar or hydropower projects, while in others, traditional landownership structures (often held by communities or tribes) make land acquisition time-consuming and costly.

Floating solar generation can make use of idle space, including surface area on water reservoirs, which can mitigate land challenges, adapt to rising sea levels, and provide additional benefits, such as increased efficiency, decreased evaporation on reservoirs, and value-added end-use services. The TA for Preparing Floating Solar Plus Projects will help (i) prepare three proposed climate-resilient floating photovoltaic projects in Kiribati, Tonga, and Tuvalu; (ii) develop a road map for deploying floating photovoltaic projects in the remaining PIC-11; (iii) incorporate productive uses of solar electricity to address the climate, energy, food and water, transport and health nexus of challenges; and (iv) leverage collaboration with development partners and the private sector to support implementation. The TA represents a cross-sector innovative approach to addressing land shortages, and will support ADB and the Pacific DMCs in realizing crosscutting benefits. All ensuing projects will be considered for financing under the Pacific Renewable Energy Investment Facility (p. 5) and the Pacific Renewable Energy Program (p. 7).

**Regional Approaches to Good Governance**

**Development of the Pacific Energy Regulators Alliance**

**Status:** Active  
**Total financing (ADB):** $0.23 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 Pacific DMCs, electricity services are provided by state-owned, 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 often 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 is promoting 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 pool...
limited resources to address common challenges. The alliance leverages a regional approach to strengthen individual power markets in the affiliated Pacific DMCs.

The TA is helping promote strong leadership, governance, coordination, and partnerships across energy regulators in the Pacific DMCs. Due to the initial success of the TA, ADB and its partner governments in the region are looking to establish a state-owned entity reform network that will deliver further support for building good governance, regulation, and implementation capacity among state-owned enterprises (SOEs) in the region.

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

**Status:** Active  
**ADB financing:** $2.03 million  
**Cofinancing:** $5.35 million  
**Total:** $7.38 million

The TA for Capacity Building and Sector Reform for Renewable Energy Investments in the Pacific is supporting the long-term sustainability of Pacific energy infrastructure. 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; and (vi) preparing sustainable investment programs and financing plans of 11 Pacific DMCs. The TA is improving energy security by supporting Pacific utilities to operate more sustainably and to generate cleaner power at lower costs.

Regional Approaches to Private Sector Engagement and Inclusive Finance

**Pacific Renewable Energy Program**

**Status:** Active  
**Total financing (ADB):** $100 million

Scaling up clean energy to adequate levels in the Pacific requires private sector engagement. The Pacific Renewable Energy Program leverages ADB’s comparative advantages in implementing renewable energy projects to encourage private sector participation, including through ADB’s Private Sector Operations Department. This cross-department 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, Private Sector Operations Department, and external private sector investors across the region.

The program is encouraging 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, or TA. It mitigates short-term liquidity risk through donor-backed letters of credit and supports long-term investment through partial risk guarantees. The program has already enabled ADB to engage in private sector renewable energy development in Tonga and is leveraging the One ADB approach to deliver finance to independent power producers (IPPs).

---

3 The $5 million grant financed by the Green Climate Fund and administered by ADB TA covers seven Pacific DMCs: Cook Islands, FSM, Marshall Islands, Nauru, PNG, Samoa, and Tonga.

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

5 ADB’s comprehensive support to scale up private sector participation in clean energy sectors across the Pacific is outlined in Box 4 on p. 23.
Preparing the Pacific Regional Financing Facility

Status: Active

Total financing (ADB): $1.2 million

Despite an abundance of sun, wind, and rivers, renewable energy resources in the Pacific remain deeply underutilized. In large part, this is due to a weak private sector and limited borrowing capacity across the Pacific DMCs. The Pacific Renewable Energy Program has been initially successful in helping to attract and structure private sector clean energy projects, but more can be done to engage the private sector in scaling up clean energy in the region.

The TA for Pacific Regional Financing Facility complements ADB’s ongoing work to drive private sector participation in Pacific clean energy. It takes a different approach from conventional nonsovereign operations by helping streamline retail financing for clean energy. The TA will seek to establish a regional financing facility to distribute about $15 million in grants to state-owned development banks across the region. National development banks may subsequently provide financing for small-scale clean energy projects, including distributed solar and energy efficiency. The facility aims to be the first of its kind in the region, and targets a distribution of 50% of available resources to lower-income households and that 20% of sub-loans go to women borrowers. The facility will support increased private sector participation in the clean energy sector, alongside resource mobilization for low-income families and women.

Box 2: Overcoming Shocks: Resilience and the New Normal for Pacific Energy Systems

The Asian Development Bank (ADB) plays a central role in helping the Pacific developing member countries (DMCs) collaborate to understand, react to, and overcome external shocks like the coronavirus disease (COVID-19) pandemic and the climate emergency. In addition to helping coordinate stakeholders across the region, ADB’s assistance is directly responding to economic shocks brought on by the pandemic and climate disasters, while supporting the Pacific DMCs to build more resilient economies and energy systems. New strategies for the region, including the Pacific Approach and ADB’s climate strategy for the Pacific, are shifting from reactive to proactive approaches—emphasizing future-proofing countries and economies across all levels of government, policy, and infrastructure development.

COVID-19 Impacts and Responses

In June 2020, ADB convened energy sector stakeholders to discuss an urgent topic: the impacts, implications, and local responses to the 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 energy security and decreasing generation costs.

The meeting highlighted that the most immediate challenge for Pacific utilities operating in the “new normal” was the steep drop in electricity demand, which significantly impacted revenue collection and threatens far-reaching issues in the medium term, including grid instability. Decreased electricity demand has been most acute in the tourism economies, where commercial consumers (including hotels) account for as much as 50% of utility business and are severely hurt by travel bans.

For example, at the height of the lockdowns in April 2020, Fiji experienced a 25% decline in power demand, while utilities in the Marshall Islands and Tonga registered 25% declines in electricity demand associated with national lockdowns. Decreased power demand had immediate impacts on revenue collection, which placed disproportionate strain on utilities in the region already struggling to maintain sound commercial performance. Travel bans have also affected capital works and delayed project implementation in a number of Pacific DMCs. Specifically, bidding processes to determine contractors for civil works and turnkey contracts have been prolonged, and commencement of physical works suspended, due to the inability of contractors to deploy personnel to project sites.

continued on next page
ADB has innovated procurement and other processes to address challenges fielding contractors and undertaking civil works. For instance, the bidding for the Renewable Energy Development project in the Federated States of Micronesia (FSM) was about to commence when border closures began—impacting the ability to perform field visits and even receive physical mail. In response, ADB supported an extended bid clarification process for potential bidders and worked with the FSM government to move the bidding process to an electronic platform to encourage global participation. This resulted in significant participation in the tender, with 12 bidders. Considerable cost savings have also been realized against cost estimates given extensive bidder interest during the bid process and the low barriers to bidder participation through digital tenders.

Similarly, in the Marshall Islands, ADB supported an extended bid clarification process for a tank farm rehabilitation project and worked with the Marshalls Energy Company to improve bidder access to information through drone data, photographs, and additional tank farm inspection reports that made it less uncertain for bidders who were unable to visit the site due to restrictions. ADB supported wider bid participation to encourage responses in the pandemic as well as a commitment letter for a letter of credit mechanism as opposed to regular contractor payments—to minimize payment delays after shipping of materials and to reduce project risks due to COVID-19 impacts on shipping and credit constraints.

Responding to the Climate Emergency

“Climate change is something we’re least responsible for, yet we’re most vulnerable to. We are asking you to please help us, help ourselves. We have the means and resources—but it is with your transformational aid that we can build resilience in Kiribati.”

—Bongraoi Arebaio, delegate from Kiribati to the Asia Clean Energy Forum

A single disaster event can erode years of development gains while also diverting essential resources away from construction and into recovery. The Pacific DMCs are among the most exposed nations, globally, to natural hazards and the effects of climate change. At the same time, natural hazards such as cyclones are increasingly common and more severe in the Pacific.

ADB has supported various Pacific DMCs in recovering from disasters, and has leveraged reconstruction to rebuild power systems to higher disaster-resilient standards. For instance, when Category 4 Cyclone Evan tore through power systems on Samoa in 2016, ADB mobilized more than $32 million to help rebuild generation assets and move parts of the network underground to insulate against future storms.
Preparing for the Future: Building Long-Term Resilience into All Levels of Assistance

In 2021, ADB launched the Pacific Approach 2021–2025 which mentions a significant scale up of support to building resilience—moving climate and disaster risk considerations from the project level up to ADB’s strategic support to government and regional planning. The new approach will enable ADB to (i) support countries to collect and analyze risk data, and use it to inform policy decisions and long-term planning across sectors; (ii) support the development of adaptation pathways; (iii) deliver more quick-disbursing assistance in the wake of disasters; (iv) provide more robust contingent finance and insurance mechanisms; (v) support the Pacific DMCs in accessing international climate finance, including from the Green Climate Fund (GCF); (vi) expand climate change support from the project level to the country and regional levels, including support for the nationally determined contributions under the Paris Agreement, and (vii) continue to climate-proof all investments.

In the energy sector, ADB is supporting the Pacific DMCs to address both climate mitigation and adaptation features. Key activities include constructing climate-resilient power systems that use domestically available renewable energy sources for generation. Clean power generation projects are helping reduce emissions and enhance energy security, while climate-resilient design features are helping ensure that new assets are built to last.


COUNTRY CONTEXT AND ASSISTANCE

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 generation mix, alongside increased access to electricity and more resilient infrastructure.

While ADB’s Pacific DMCs face a similar set of energy challenges, each country has a unique operating context, and requires varying levels of support. Some countries, like Papua New Guinea or Solomon Islands, have highly dispersed populations and continue to face critical challenges in providing electricity to outer islanders or rural populations. Other countries, such as Samoa and Nauru, have more concentrated populations, but experience high generation costs linked to diesel dependence and associated import costs. Similarly, enabling environments differ from country to country—some countries lack grid capacity to manage new intermittent sources of renewables, while others face financial or public sector barriers to private sector participation in generation.

ADB’s energy sector work at the country level combines experience working alongside national and subnational governments with regional solutions to overcome perennial sector challenges. For instance, country-level projects under the Pacific Renewable Energy Investment Facility and the Pacific Renewable Energy Program leverage regional approaches to improve operational efficiency, while implementing specialized solutions that respond to country and subnational power sector requirements.

The remainder of this report describes the unique operating environments in each of the Pacific DMCs where ADB provides energy sector support, alongside the solutions ADB and its development partners are implementing to address localized challenges.
Historically, the Cook Islands has been almost entirely dependent on imported diesel for power generation. In 2012, about 99% of generation came from diesel, and corresponding fuel costs accounted for about a quarter of the country’s total imports expenditures. High electricity costs and limited power supply are key barriers to inclusive growth and poverty reduction, particularly for outer island communities across the Cook Islands.

Supplanting diesel with renewables can reduce generation costs in the Cook Islands by up to 40%. This in turn can lower household and business expenditures on electricity, improve energy security, and reduce carbon emissions. The shift to renewables also creates opportunities to electrify outer island communities with more affordable clean power.

ADB is supporting the Cook Islands to redefine its power sector by investing in solar energy generation and battery energy storage systems (BESS) and by building capacity to manage new assets sustainably. Ongoing support to build clean power generation and increase efficiency is delivering tangible impacts for people, communities, and businesses across the country.

Renewable Energy Sector Project

**Status:** Active
ADB financing: $11.19 million
Cofinancing: $23.51 million
Total financing: $34.71 million

The **Renewable Energy Sector Project** is installing solar power generating systems on five islands and creating opportunities for downstream private investment in renewable generation.

The original project was approved in November 2014, and in 2017, the Global Environment Facility and the Green Climate Fund provided two separate additional financing grants that have significantly expanded the scope of the original project with battery energy storage that will enable more private sector investment.
The project has already (i) built a combined 2.5 megawatt (MW) peak of solar photovoltaic and 7.5 megawatt–hour (MWh) of battery energy storage for mini-grids on the 5 small islands of Atiu, Aitutaki, Mangaia, Mauke, and Mitiaro; (ii) improved energy sector capacity; (iii) installed two battery energy storage systems of 2 MW/8 MWh and 6 MW/3 MWh on Rarotonga to allow more renewable energy generation; and (iv) built capacity of local residents to operate and maintain the equipment. The solar systems were completed in October 2019 and have already begun delivering transformative results, including

(i) achievement of 100% access to electricity on the five islands;
(ii) annual reduction of 5 million liters of imported diesel fuel;
(iii) annual savings of $6.9 million from reduced fossil fuel consumption; and
(iv) reduction in residential tariffs from $0.63 to $0.47 per kilowatt–hour.

BESS installations will allow the state-owned utility, Te Aponga Uira, to connect more intermittent electricity generated by solar power, ensuring grid stability and reliability of supply. The BESS will enable the private sector to add approximately 6 MW peak of solar capacity to the grid in Rarotonga, bringing deeper decarbonization and energy security for the country.

Works completed to date have already earned the project the Global Solicitation of Poverty Reduction Best Practices Award for its support in alleviating poverty and creating jobs in outer island communities. The project has transformed lives with increased access to clean energy and improved electricity supply, and corresponding access to information and communication technology. Outer islanders are using electric appliances for income–generating activities such as producing bread, coconut oil, sauce, and jam from local produce and selling these products in Rarotonga. Access to electricity also means that residents can use computers, televisions, radios, the internet, and mobile connectivity to advance education, job opportunities, and quality of life.

“I grew up on the island of Mitiaro and saw life with diesel power. In those times we had so many problems: power going off, blackouts ... I remember at 12 noon every day the power was cut off in order to save diesel. Now, with solar on Mitiaro we have power 24/7. Being a baker on the island, if we were still on diesel power I couldn’t bake at midnight or early in the morning. Solar has allowed me to do that. My customers are happy to receive hot bread baked early every morning.”

—Rangi Kimiora, Mitiaro baker
The Federated States of Micronesia (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 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. 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 a 100% electrification by 2025 and a 63% share of power generation from renewable energy sources by 2027.6

ADB is supporting the FSM by addressing diverse power sector needs at the state level. In December 2018, ADB successfully completed the Yap Renewable Energy Development Project. It is now implementing 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 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

**Status:** Active  
**Total financing (ADB):** $24 million ($15 million, $5 million project readiness financing, and $4 million additional financing)

The Renewable Energy Development Project is increasing the renewable energy penetration rate in Kosrae and Yap and will increase energy security for the FSM as a whole. In addition to integrating solar photovoltaic systems into the main grids of 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:

**YAP STATE**
- **800 kW/800 kilowatt-hours (kWh) BESS** at the power station
- **1.95 MWp** of ground-mounted solar photovoltaic
- **300 kilowatt peak (kWp)** of rooftop solar photovoltaic at the sports center, and
- Upgrade to power station supervisory control and data acquisition (SCADA) systems.

**KOSRAE**
- **1.15 MWp** of solar photovoltaic on the main grid
- **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 Pohnpei Utilities Corporation to implement reforms that will strengthen its commercial performance and support long-term operational sustainability.

Proposed additional financing in 2021 will enhance the disaster risk reduction (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 that reduces outages, improves renewable energy utilization, and enhances disaster resilience in Kosrae, Pohnpei, and Yap. The additional financing will improve the DRR capacity of all FSM utilities by developing a disaster resilience plan, conducting geographic information system mapping, and providing operation and maintenance (O&M) and DRR capacity building to the utilities.
Box 3: Sustainable Energy Services: Capacity, Governance, and Delivering Clean Electricity

Progress toward Inclusive and Sustainable Electricity Services

The Asian Development Bank (ADB) is the largest development partner in the region by lending volume, and from 2007 to 2020, it helped construct or upgrade

- 94.30 MW of renewable energy power generation
- 2,890 kilometers of transmission and distribution lines, and
- 25,431 new household connections to sources of electricity

New and refurbished assets have delivered cumulative emission reductions of 375,128 tons of avoided carbon dioxide. New household connections and outer island mini-grids are supporting improved education and health sector management, while enabling communities to participate meaningfully in the economy by improving information and communication technology resources. However, capacity constraints and poor commercial performance of utilities threaten the long-term sustainability of infrastructure and services across the region.

Barriers to Sustainable Service Delivery

The Pacific developing member countries (DMCs) face a three-part challenge when it comes to delivering sustainable energy services. First, they still lack essential generation and distribution infrastructure to provide affordable clean energy to communities, particularly those outside of urban centers. Second, persistent capacity constraints across the public and private sectors mean that many state-owned utilities lack the knowledge and resources to manage and maintain existing assets, let alone design and construct new ones. Third, ineffective sector governance and tariff regimes—paired with dependence on expensive imported diesel—lead to exceptionally high generation costs and poor commercial performance of power utilities.

Lasting Solutions to Perennial Problems

The Pacific Approach and the country partnership strategies for Fiji and Papua New Guinea emphasize the need to support the Pacific DMCs in constructing, managing, and maintaining clean power infrastructure, as well as supporting utilities to operate more efficiently. TA and lending activities are addressing the energy dilemma by pairing construction with support to build capacity, strengthen utility performance, and improve sector regulation—all with the unified objective of more sustainable energy services for communities across the region.

To achieve this, ADB’s 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 different channels, including stand-alone TA, policy-based loans, concessional loans and grants, and specific covenants under its infrastructure projects. The new Pacific Approach also introduces the concept of capacity supplementation—the practice of embedding sector experts on a long-term basis—to ensure that capacity remains within countries and organizations beyond the project life cycle. Crucially, ADB is supporting energy sector stakeholders across the region to share experiences and develop communities of best practices through initiatives like the Office of the Pacific Regulator’s Alliance (p. 6), which helps establish a scalable network of sector experts and policymakers with common objectives.

Kiribati is a remote Central Pacific country comprising 32 atolls and a coral island spread across 3.5 million km² of ocean and multiple time zones. More than half of the nation’s estimated 120,000 residents live in the capital of South Tarawa. Kiribati’s distance from major markets leads to high import costs, while the county’s low elevation—averaging only 2 meters above sea level—creates high vulnerability to natural hazards associated with climate change.

Kiribati’s distance from markets and high reliance on imported diesel contribute to one of the highest costs of power 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 the grid, high electricity costs suppress demand, impede business growth, and contribute to energy poverty in households. At the same time, power generators on Kiribati are nearing the end of their economic lifespans—leading to frequent blackouts that affect businesses and families alike.

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

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 partners, and (iii) a policy and regulatory environment that is not conducive to private sector investment. ADB is supporting government efforts to install more solar generation while addressing each of these barriers.
**South Tarawa Renewable Energy Project**

**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 capital and pave the way for further investments in clean energy. Financed under the Pacific Renewable Energy Investment Facility, the project will deliver 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, while improving the operational and financial sustainability of the water and power utility. The project was designed to maximize synergies with the South Tarawa Water Supply Project approved in 2019, which will also install 2.5 MWp of solar photovoltaic and 0.5 MWh battery energy storage systems in the same site. Under the energy project, the Pacific Department will deliver ADB’s first cross-division joint procurement for the two projects. The projects will enable an increase from 9% to more than 44% renewable energy penetration in South Tarawa by 2025, thus exceeding the country’s target. The project will make this physically possible by modernizing the network and adding a large BESS to support more intermittent generation. The project will also support power sector reforms and help develop an enabling environment to foster private sector investment in the clean energy sector. Increased access to affordable clean power will drive economic growth and improve living conditions in the capital.
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 of the nation’s capital, Majuro, which is almost entirely dependent on diesel for power generation and accounts for 72% of national electricity demand.

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 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. ADB is helping build capacity and strengthen the commercial performance of MEC, alongside corresponding investments to improve system efficiency, enable the uptake of new renewable sources of power, and address key safety concerns.

**Majuro Power Network Strengthening Project**

**Status:** Active

**Total financing (ADB):** $2 million

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

The project is also strengthening MEC’s financial sustainability with comprehensive support for management improvements and business process reengineering. The reforms target 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.
**Energy Security Project**

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

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

The tank farm is just 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 the facility. MEC and the government flagged refurbishments as an urgent investment need to safeguard against potential health, safety, economic, and environmental risks associated with fuel leaks or a catastrophic tank failure.

The Energy Security Project is (i) rehabilitating the fuel tank farm and instituting a comprehensive operation and maintenance plan, (ii) mitigating safety and environmental risks associated with handling refined petroleum products, and (iii) improving the overall fuel security of the Marshall Islands. Additional financing will enhance the resilience of national energy systems to natural hazards 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 help provide a 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 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 to support 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 is an isolated island in the central Pacific with a land area of 21 km² and a population of about 13,300 people. Access to grid electricity 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.7

Scaling up renewable energy power generation can greatly improve Nauru’s energy security, in support of a more reliable, affordable, clean, and environmentally sustainable power supply. 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 in strengthening the utility sector and amending 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 MWp grid-connected solar plant and a 5 MW/2.5 MWh 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 power generation and BESS, their integration into the grid, finance and accounting, and gender mainstreaming.

---

7 ADB is also working with the Government of Nauru to build a climate-resilient port that will increase transport efficiency and help safeguard imports against climate risks. See ADB. 2017. Report and Recommendation of the President to the Board of Directors: Proposed Grant and Administration of Grants. Nauru—Sustainable and Climate-Resilient Connectivity Project. Manila.
Palau comprises some 340 islands in the North Pacific and is home to about 18,400 people. 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 confronts 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 (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.
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 financial 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 and foster greater coordination with key development partners, including ADB and the International Monetary Fund.

Box 4: Leveraging the One ADB Approach to Scale Up Private Sector Participation Across Pacific Energy Sectors

Private sector participation is essential to transforming power sectors across the Pacific. Independent power producers (IPPs) are well-placed to increase generation capacity with renewable energy, improve quality and service standards, and increase access to electricity.

However, private sectors in most of the Pacific developing member countries (DMCs) are underdeveloped and lack the enabling environments to support public–private partnerships or IPP involvement in energy sector development. At the same time, many Pacific power grids are not capable of accepting new sources of intermittent power generation from renewables, while state-owned power utilities (the principal offtakers for IPP power supply contracts) lack the creditworthiness to support bankable projects financed by the private sector. As a result, until 2019, none of the Pacific DMCs had successfully entered into an IPP contract or a public–private partnership in the energy sector.

Enabling Private Sector Participation in Pacific Energy Sectors

ADB has leveraged the close collaboration between its sovereign and nonsovereign operations departments to open doors to deeper private sector involvement in power sectors across the Pacific. Recognizing the need to rapidly introduce IPPs into Pacific power sectors, ADB has developed several replicable models that are helping to overcome regional barriers to private sector engagement.

The Pacific Renewable Energy Program (PREP) (p. 7), for example, enabled an IPP contract in Tonga—the first of its kind in the country—which will deliver solar power at a utility scale (Case Study 1). ADB’s Pacific Department and its Office of Public–Private Partnership are also enabling the first-ever IPP contract in Palau (Case Study 2).

CASE STUDY 1:
Leveraging the Pacific Renewable Energy Program to Enable 6 Megawatts of IPP Solar Power in Tonga

In Tonga, ADB’s Pacific Department helped introduce battery energy storage to the grid to enable the addition of intermittent sources of power. Subsequently, ADB’s Private Sector Operations Department leveraged PREP to enhance the creditworthiness of the Tongan utility, Tonga Power Limited, while the ADB’s Private Sector Development Initiative helped develop a tender to engage an IPP. 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 $0.36 per kilowatt-hour to $0.11 per kilowatt-hour and reduce CO₂ emissions by about 6,125 tons per year. The financing documents are being finalized and the loan will be drawn down post-completion of the project.

continued on next page
One-ADB Collaboration is Enhancing Renewable Energy Systems in Tonga

**PREIF**
Supports the 11 small Pacific island countries in transforming their power sectors from diesel to sustainable energy generation resources.

It also supports regional approaches for energy sector reform, private sector development, and capacity building.

**TREP**
PARD was the accredited agency that arranged the $29.9 million grant from the Green Climate Fund for the installation of a BESS in Tongatapu, the largest island in Tonga.

BESS will ensure that the intermittent electricity generated from the solar PV and wind power can be stored and used overnight without negatively affecting the grid.

**PREP**
PARD and PSOD designed and developed a credit enhancement structure to support the creditworthiness of power utilities where governments were no longer able or willing to provide government guarantees for their power utility’s offtake obligations.

Technical assistance from the PREIF was used to hire a consultant for the market sounding and design.

**Tonga 6 MW IPP**
Technical assistance was provided from PSDI to advise Tonga Power Limited on the preparation of the tender process and drafting of the PPA.

**Financing of the winning bidder by PSOD underway.**
- Expect to lower tariff from $0.36 per kWh to $0.11 per kWh.
- EGM for SGE.
- Avoided emissions: 6,125 tons of carbon dioxide equivalent annually and 153,148 tons over 25-year life cycle of the PPA.


### CASE STUDY 2:
### Generating Clean Power with Public–Private Partnerships

The sound commercial and operational performance of utilities is a prerequisite for entering long-term power purchase agreements. In Palau, ADB’s Pacific Department (PARD) and Office of Public–Private Partnership (OPPP) have been working together with the government and the Palau Public Utilities Corporation (PPUC) to make private investments in renewable energy possible.

The Palau Public Utilities Corporation Reform Program (p. 23) is leveraging ADB’s sovereign lending activities to strengthen PPUC’s performance, while OPPP provided transaction advisory services to support the public utility in structuring a solar photovoltaic project in two phases. In parallel, PARD supported the regulator, the Palau Energy Authority, in reviewing IPP proposals. PARD also supported a grid impact study, which will be essential to integrating power generated from new sources of renewable energy into the grid.

Collaboration between PARD and OPPP 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. The solar plant will be the first ever built by an IPP in the country, and among the largest IPP renewable energy projects in the region. The public–private partnership and the One-ADB approach used to realize it, serve as replicable models that can be introduced to other Pacific DMCs.

Disaster Resilient Clean Energy Financing Facility Project

Status: Active
ADB financing: $3 million (from the Japan Fund for Poverty Reduction)

Since 2012, Palau has experienced several natural hazards, causing cumulative losses of about $51 million. Given its centralized electricity network and concentrated power supply, Palau’s energy assets are the nation’s infrastructure that is most vulnerable to the effects of climate change and natural hazards. 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. Implementing disaster resilience upgrades, energy efficiency retrofits, and rooftop solar systems for households and buildings can significantly enhance resilience while contributing to national climate change 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 on-lending 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 finance for women and women-run households. 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 is the first financial intermediation initiative targeting disaster-resilient clean energy in any of the Pacific DMCs.
Papua New Guinea (PNG) is the largest of ADB’s Pacific DMCs, both in terms of population and landmass. Providing more access to reliable electricity can drive economic growth and improve the quality of life across PNG.

Currently, about 13% of the total population and only around 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 increase electrification rates and improve electricity services.

To achieve this, the government has set a national target of achieving a 70% electrification rate by 2030. ADB is supporting these efforts with a multitranche financing facility (MFF) and a number of large-scale 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.
Town Electrification Investment Program

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

Town Electrification Investment Program, Tranche 1

Status: Closed

ADB financing: $52.17 million
Cofinancing: $4.77 million
Total financing: $56.94 million

Tranche 1 was completed in February 2021 and comprised three subprojects: (i) construction of transmission lines to connect provincial centers, (ii) replacement of diesel generators with hydropower plants, and (iii) capacity building for local stakeholders to support long-term 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):** $46.14 million

Tranche 2 is nearing completion and is refurbishing two existing hydropower plants that were operating below their nameplate capacities. Rehabilitating the two aging hydropower plants will extend their economic life by 20–25 years and ensure that they meet 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.

Overall improvements to grid connectivity and rural electrification under the investment program will enable the use of reliable and clean power in provincial urban centers, alongside improved living conditions and economic opportunities for urban and rural communities.

**Port Moresby Power Grid Development Project**

**Status:** Active  
**Total financing (ADB):** $65.73 million

Access to electricity is essential for inclusive socioeconomic growth. PNG is one of the most underserved countries in the Pacific region in terms of energy access. As a result, improving the power supply will play a pivotal role in empowering communities and businesses nationwide.

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—atop heavy demand and inadequate maintenance—has led to unreliable power supply and increased dependence on diesel for generation. Renovating existing assets and improving transmission and distribution infrastructure are essential to supporting the capital’s growth.

The Port Moresby Power Grid Development Project is addressing these needs by (i) rehabilitating two existing hydroelectric plants (Rouna 1 and Sirimunu), (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 supply-side energy efficiency and will provide improved access to renewable power. It will provide a better power supply for Port Moresby and deliver the impact of increased economic activity among grid-connected residential and commercial consumers.

**Power Sector Development Project**

**Status:** Proposed  
**Total financing (ADB):** $208.6 million  
**Cofinancing:** $62.0 million  
**Total financing:** $270.6 million

The Power Sector Development Project will massively increase electricity access across the country, raising the national electrification rate from 13% to 20% by 2030. The project will (i) strengthen and expand the transmission and distribution network, and (ii) provide institutional support and capacity building for a range of power sector stakeholders.

Construction activities will lay or upgrade around 2,509 km of transmission and distribution lines across the country—benefiting the National Capital District; Port Moresby; and the provinces of East New Britain, West New Britain, and Madang. The project will improve socioeconomic conditions by providing reliable power services to the people of PNG.
Samoa is made up of nine islands, and about 95% of its population lives 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 all of its 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 have been successful in attracting private sector in the clean energy sector, with support from ADB.

Renewable Energy Development and Power Sector Rehabilitation Project

Status: Closed in 2021
ADB financing: $11.0 million
Cofinancing: $2.49 million
Total financing: $13.49 million

The Renewable Energy Development and Power Sector Rehabilitation Project supported 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 hazards.

The project assisted EPC in rehabilitating and reconnecting 4.69 MW of hydropower capacity to the grid, and building and connecting an additional 3.3 MW of hydropower to the network. Hydropower capacity increased with the addition of the Fuluasou small hydropower plant and cancellation of the Falease’ela small hydropower plant, and the project also installed a third 2-MW generator at Ta’elefaga. The project’s outcome is a higher share of electricity generated by hydropower sources, and its impact will be greater energy security. ADB is supporting training and knowledge-sharing activities to 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 a 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 project is expanding 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. It 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.

---

**Alaoa Multipurpose Dam Project**

**Status:** Proposed  
**ADB financing:** $65.7 million

The Vaisigano River is the largest river in Samoa and is the main source of drinking water for 60% of the 50,000 people living in the capital, Apia. Extreme weather events have caused major flooding of the Vaisigano River, damaging public and private properties along the waterway. Furthermore, the river’s catchment has very steep slopes, increasing the risk of flashfloods following heavy rain. The river is susceptible to both flooding and drought, which threaten drinking water supplies and compromise 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 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 droughts, (iii) improve Samoa’s energy 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 and reduces Samoa’s dependence on diesel imports for power generation.
Solomon Islands consists of six major islands and nearly 1,000 smaller islands covering a land area of more than 28,000 km². The country faces a number of critical energy challenges. Electrification rates across the country are low, particularly on the outer islands, while grid-connected power in urban areas is primarily diesel generated and insufficient to provide for growing demand. High costs and limited power supply stunt economic growth and private sector development.

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. ADB is supporting the country on its pivot toward renewables in both rural and urban areas.

**Tina River Hydropower Project**

*Status: Active*

ADB financing: $30 million  
Cofinancing: $175.5 million  
Total financing: $205.5 million

The Tina River Hydropower Project will change power generation in the capital city of Honiara, and more broadly, the 15 MW hydropower system underpins a paradigm shift in power generation for the nation. It is increasing the share of renewable energy supplying Honiara’s electricity grid, which will lead to a corresponding decrease in the cost of power generation in the capital.

Once complete, the plant is expected to meet about 68% of Honiara’s projected electricity demand. This will provide sufficient flexibility in the power system to permit further integration of renewable energy without the need for additional battery storage. Successful commissioning of the plant will contribute an estimated savings of 49,500 tons of CO₂ equivalent per year—more than twice Solomon Islands’ commitment in its Intended Nationally Determined Contribution under the United Nations Framework Convention on Climate Change.
Solar Power Development Project

Status: Active
ADB financing: $1.71 million
Cofinancing: $6.20 million
Total financing: $7.91 million

The Solar Power Development Project will (i) increase the supply of renewable energy in Solomon Islands, (ii) decrease the cost of generating electricity by replacing diesel generation with less expensive solar power, and (iii) reduce greenhouse gas emissions.

The project will install a total of 2 MW of grid-connected solar power and build capacity in the O&M of small grid-connected hybrid solar systems for staff of the local utility, the Solomon Islands Electricity Authority. The project will implement a total of five solar-diesel hybrid systems at different sites in five provinces. The solar power plants will replace 66%–87% of diesel generation and increase the supply of clean and reliable power at the sites in Kirakira (320 kW), Lata (290 kW), Malu’u (140 kW), Munda (1,000 kW), and Tulagi (250 kW). The project will also install BESS to allow higher penetration of intermittent solar power.
Tonga comprises 171 islands spread over the 5 island groups of ‘Eua, Ha’apai, Niuas, Tongatapu, and Vava’u. Although 89% of households have 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 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.

**Cyclone Gita Recovery Project**

*Status: Closed in 2021*

*Total financing (ADB): $6.8 million*

The Cyclone Gita Recovery Project reconstructed and upgraded priority sections of the electricity network in Nuku’alofa that were damaged by Tropical Cyclone Gita in February 2018. The assistance package leveraged ADB’s comparative advantage in supporting power sector improvements and reconstruction activities in Tonga, and helped create a safer, more reliable power network for the capital.
The project restored access to electricity supply and helped make the network more resilient to future storms. It rehabilitated the existing high-voltage and low-voltage overhead network by using disaster resilience measures, and installed new underground cable connections to consumer meters that are more resistant to storms. The build-back-better approach factored in opportunities to climate- and disaster-proof new assets, and network upgrades contributed to ongoing reconstruction efforts in Nuku'alofa, which will rebuild the city to a higher standard of disaster resilience overall.

**Outer Island Renewable Energy Project**

**Status:** Active  
**ADB financing:** $14.00 million  
**Cofinancing:** $14.11 million  
**Total financing:** $28.11 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 70% by 2030. The Outer Island Renewable Energy Project is supporting this goal by constructing solar generation systems on the islands of ‘Eua, Niuafo’ou, Niuatoputapu, and Lifuka, and the four outer islands in the Ha’apai group. The project is also upgrading the network on ‘Eua and Vava’u, with a total preliminary capacity of 1.32 MWp.

The project is helping Tonga build photovoltaic systems into both existing grids and new ones, 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.

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 (including the main island of Lifuka, as well as the four outer islands of Ha’afeva, Ha’ano, Nomuka, and ‘Uiha) 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. It 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 and replicable model. It will produce the sustainable impact of reduced dependence on imported fossil fuel for power generation.
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 is developing the country’s first large-scale battery storage of 19.9 MWh capacity in the Tongatapu network to absorb intermittent renewable energy and to facilitate private sector investment in renewable energy generation. The battery storage is expected to help absorb 22 MW of solar and wind systems to be funded by IPPs. It 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 also 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.

The application of BESS will enable Tonga to increase renewable energy penetration up to 50% nationwide without negatively affecting the island grids. The project will avoid emissions of more than 13,000 tons of CO₂ equivalent annually. It will also deliver capacity building, which will help Tonga transition to cleaner sources of power, to reduce reliance on imported fossil fuels and encourage private investment in renewable energy.
Tuvalu has a population of about 11,000 spread across eight islands. Although 98% of households have access to electricity, Tuvalu is highly dependent on diesel for power generation. As seen with 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 vastly improve 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, then to concentrate its efforts on Funafuti.

**Increasing Access to Renewable Energy Project**

*Status: Active*

*Total financing (ADB): $6 million*

The Increasing Access to Renewable Energy Project is scaling up the peak installed capacity of solar generators on three outer islands, adding BESS and new solar capacity to the Funafuti grid, 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:

- **44.8 kW** of solar photovoltaic in Nukulaelae
- **78.4 kW** of solar photovoltaic in Nukufetau
- **100.8 kW** of solar photovoltaic in Nui
- **500 kW** of solar photovoltaic in Funafuti
- **1 MW by 2 MWh** BESS in Funafuti

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, avoid 17,800 tons of CO₂ equivalent greenhouse gas emissions over the project’s lifetime, and support Tuvalu in achieving close to 100% renewable energy for power generation by 2025.
Vanuatu is an archipelago with a population of 301,700 people spread across 84 volcanic islands in the West Pacific. It is ranked as the world’s most vulnerable country to natural hazards 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 2016 update of the Vanuatu National Energy Road Map targets a 100% electrification rate and a 100% renewable energy share of the generation mix by 2030.

The power sector is operated by two private utilities, which manage government-owned assets. Vanuatu Utilities and Infrastructure Limited operates the Lugarville electricity concession on Espiritu Santo (the largest island), and Union Electrique du Vanuatu operates a concession in the most populous island of Efate (99,800 people). In July 2021, the government released a tender for the operations of the Malekula (the second-largest island), and Tanna Island assets for 20 years. ADB is supporting Vanuatu to increase electricity access and supply renewable energy baseload on both Espiritu Santo and Malekula.

Energy Access Project

Status: Active
ADB financing: $11.05 million
Cofinancing: $8.2 million
Total financing: $19.25 million

The Energy Access Project is installing a 400-kW run-of-river hydropower plant, with the capacity to supply 90% of electricity generated for the Malekula grid until 2040. The project is also extending grid infrastructure, including 21 km of transmission lines and 79 km of distribution network, on Vanuatu’s two largest islands to connect an additional 1,050 households to the grid. Grid extensions will increase the electrification rate from 8% to 14% on Malekula and from 22% to 29% on Espiritu Santo. The project will displace diesel generation and is expected to reduce emissions by 2,900 tons of carbon dioxide equivalent by October 2023 against the 2017 baseline.

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.
Box 5: Innovation Hub: Charting the Way to the “Next Normal”

“The low-carbon transition of our region requires fundamental changes in our development efforts. Our region needs disruptive innovation, cross sectoral solutions, transformative, and adaptive technologies and approaches.”

—Leah C. Gutierrez, Director-General, Pacific Department. Excerpt of speech delivered at the 2021 Asia Clean Energy Forum

ADB’s new energy policy, the Pacific Approach, and the country partnership strategies for Fiji and Papua New Guinea call for a shift in Pacific energy sectors. They bring to the foreground the need to provide affordable access to clean power for all, while encouraging deeper participation of the private sector to support sustainable service delivery on a commercially sound basis. The strategies also call for innovation in the ways ADB implements projects and partners with governments and communities. At the same time, Pacific developing member countries (DMCs) are increasingly focused on building resilience, strengthening fuel security, and achieving mitigation and adaptation targets under their Nationally Determined Contributions to the Paris Agreement.

ADB is centrally placed to support the Pacific DMCs in their structural shift away from fossil fuels and toward clean power generation. Support to Pacific energy sectors to date has significantly scaled up generation and energy storage capacity, expanded grid connections, and fostered improved utility performance. Looking ahead, ADB will increasingly use targeted knowledge products and TA to evaluate emerging technology solutions and to spur deeper involvement of the private sector in energy systems across the region.

The coronavirus pandemic has highlighted the need for innovation, and has prompted ADB and counterpart governments across the region to explore technology solutions to both short- and long-term challenges. For instance, during the height of lockdowns, ADB made use of drone technology to conduct virtual site visits, which would have been impossible in person. In both Kiribati and Tuvalu, drones and other modern information and communication technology enable ADB to engage local communities and continue civil works, even when international contractors could not be fielded. In Tuvalu, the Increasing Access to Renewable Energy Project is deploying solar generation on three remote outer islands. To cope with travel restrictions and limited local capacity, the project is using drones, smartphones, tablets and supporting software so that local island representatives can take digital images of the site, activities, drawings, and document; and send field reports in real time. These technologies enable remote inspection, monitoring, supervision, and capacity building, with local project supervisors communicating with the project management unit on the main island, the main works contractor in Fiji, and the construction supervision consultant in New Zealand. The innovative use of technology addresses immediate needs for images of local sites, and will be replicable across other projects in the future. ADB will continue exploring the use of technology to address immediate needs, while also improving the longer-term efficiency of project planning and implementation.

ADB is turning the unique challenges of the Pacific into opportunities for innovation. The joint procurement pioneered under the Kiribati South Tarawa Renewable Energy Project and South Tarawa Water Supply Project achieves economies of scale, harmonization of standards, and cross-sector benefits. ADB will increasingly leverage cross-bank resources through the One ADB approach, while introducing innovations in procurement and capacity building to increase the efficiency, effectiveness, and sustainability of its projects in the region. ADB will continue to work with domestic stakeholders through its Pacific country offices to understand the unique needs and opportunities present in the small island developing states across the region. Together, ADB and the Pacific DMCs will continue to develop clean energy infrastructure and enabling environments to support a thriving and resilient Pacific community.

CONCLUSION

ADB’s work in the Pacific energy sector is helping achieve the Strategy 2030 vision of a prosperous, inclusive, resilient, and sustainable Asia and the Pacific. Energy sector operations are increasing access to affordable, reliable, and clean electricity that powers people, communities, and economies across the region.

ADB’s blend of financing and TA focuses on meeting infrastructure needs while ensuring that institutions and communities have the capacity to manage it well into the future. Infrastructure investments are improving fuel security, contributing to climate change mitigation, and increasing access to essential services for urban and rural populations. In parallel, support for policy and institutional reforms targets the long-term sustainability of energy sector development across the region. ADB’s complementary roles as a knowledge bank and financier enable it to deliver lasting impacts through deep partnerships with local governments.

Despite progress to date, ADB and its Pacific DMCs have a long way to go in terms of constructing, climate-proofing, and managing infrastructure to deliver affordable services to all. As the Pacific DMCs continue to develop their energy infrastructure, ADB remains committed to fostering innovation and deeper collaboration between the public and private sectors. ADB will continue working with its partners to explore emerging technology solutions and to facilitate partnerships across the public and private sectors that deliver transformative impacts at scale.
Pacific Energy Update 2021

The Pacific Energy Update series provides an annual review of the Asian Development Bank’s technical assistance, grant, and lending activities in the region. The 2021 update showcases the impacts and outcomes of ongoing and recently completed initiatives as of December 2021 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.