

RALI Series: Promoting Solutions for Low Emission Development

Empowering Low Emission Development in the Pacific

The RALI Series is a collection of papers developed by the RALI project to share examples of low emission development in practice. The series features case studies, tools, and innovative new approaches in this space, highlighting user benefits and lessons learned. To learn more about the RALI project, visit <https://www.climatelinks.org/projects/rali>.

March 2018

Spread across 300,000 square miles of the Pacific Ocean, 14 island nations are tackling the challenge of transitioning to low-emission energy with a sense of urgency and resolve. Though small in scale, the experiences of these countries demonstrate technical approaches and regional collaboration useful to other nations around the world.

On a global scale, greenhouse gas emissions (GHGs) from these islands and other Small Island Developing States (SIDS) are negligible.¹ Yet the very existence of many islands is threatened by [climate-related impacts](#). Island nations are already feeling the impacts of sea level rise, ocean acidification, changes to the frequency and intensity of hurricanes, changing precipitation patterns, and coastal erosion. These nations understand the importance of reducing levels of GHGs through low emission development strategies (LEDS), and understand how LEDS link directly to their economic imperatives and sustainable development goals.

Island nations are embracing renewable energy, driven by a critical need to increase their resilience to a changing climate; to reduce their dependence on expensive, imported fuel for diesel-powered electricity generation and transportation; and to lift remote island communities from energy poverty. SIDS are adopting ambitious targets to empower their energy transition, both to attract investment and technical support from development partners and to motivate larger GHG emitters to adopt similarly ambitious renewable energy goals.

High Ambition Targets



Picture 2. Leaders at SIDS Lighthouse Initiative meeting (SIDS Action Platform)



Picture 1. Map of the Pacific Islands (Peacesat)

To underscore their commitment to renewable energy, SIDS recently came together for the inaugural meeting of the [Initiative for Renewable Island Energy \(IRIE\)](#) on October 10-11, 2017. Energy and environment ministers from member countries of the Alliance of Small Island States (AOSIS) discussed methods to accelerate renewable energy development. IRIE complements the [Lighthouse Initiative](#), a program started in 2014 to mobilize finance for 100 megawatts (MW) of new solar capacity and 20MW of wind power in SIDS over five years. IRIE aims to promote renewable energy by mobilizing finance, eliminating legal barriers, and providing human resources needed to drive a low-carbon future.

¹ Combined, the members of the Alliance of Small Island States (AOSIS) contribute [less than 0.2% of global greenhouse gas emissions](#).

Pacific Islands in the Forefront of Change

The 14 Pacific Island Countries (PICs) are in the forefront of the transition to low-emission, renewable sources of power that simultaneously enhance resilience in the face of climate change. Many of the PICs are dependent on diesel power generation, which is expensive and polluting. These countries have some of the world's highest fuel costs, which are also volatile due to fluctuations in international markets. On average, fuel consumption accounts for 10% of PICs' national income.

PICs have committed to ambitious renewable energy targets – many are aiming to achieve 100% renewable energy within 8-15 years (see Table I). Many PICs have increased the ambition of their renewable energy targets in response to the Paris Agreement – as reported in the [Transparency Partnership](#). Also, countries reported GHG emission reduction targets (see Table I) in their Intended Nationally Determined Contributions (INDCs), noting that these targets could be ramped up significantly should international assistance be provided. Each PIC has developed an energy strategy, often called a National Energy Roadmap, to guide the required investments to empower this transition.

Table I. Pacific Islands' Greenhouse Gas and Renewable Energy Targets

| Pacific Island Country or Territory | National Energy Roadmap/Strategy | Unconditional National GHG Emission Reductions Target (%) | Renewable Energy Target |
|-------------------------------------|--|--|--|
| Cook Islands | National Energy Policy (2003) Renewable Energy Chart Implementation Plan 2012 Renewable Energy Chart 2016 | 12% below 2015 levels by 2025 30% below 2015 level by 2030 | 100% by 2020 |
| Fiji | National Energy Policy 2013 Sustainable Energy For All | 30% of BAU by 2030 | 100% by 2030 |
| Federal States of Micronesia | Energy Policy 2010 | 28% below 2000 by 2025 | |
| Kiribati | Kiribati National Energy Policy 2009 | 13.7% of BAU by 2025 12.8% of BAU by 2030 | 33% by 2025 |
| Republic of Marshall Islands | National Energy Policy and Energy Action Plan 2016 | 32% below 2010 levels by 2025 45% below 2010 levels by 2030 | 20% by 2020 |
| Nauru | Nauru Energy Policy Framework, 2009 (NEPF) Nauru Energy Road Map 2014-2020 | Not quantified in INDC | |
| Niue | Niue Energy Policy and Action Plan 2005 Niue Strategic Energy Road Map 2015-2025 | Not quantified in INDC | 100% by 2020 |
| Palau | Palau National Energy Policy, 2010 Palau Energy Act 2016 | 22% below 2005 levels by 2025 | 45% by 2025 |
| Papua New Guinea | National Energy Policy 2016-2020 | Not quantified in INDC | 100% by 2030 |
| Samoa | Samoa Energy Sector Plan 2012- 2016 | Not quantified in INDC | 100% by 2025 |
| Solomon Islands | National Energy Policy Framework 2007 National Energy Policy 2014 Renewable Energy Strategies & Investment Plan 2014 | 12% below 2015 levels by 2025 30% below 2015 levels by 2030 | 100% by 2030 |
| Tonga | Tonga Energy Roadmap 2010-2020 (TERM) | Not defined | 50% by 2020 70% by 2030 100% by 2035 |
| Tuvalu | Enetise Tutumau 2012-2020 (Master Plan for Renewable Electricity and Energy Efficiency in Tuvalu) | 60% below 2010 by 2025 | 100% by 2020 |
| Vanuatu | Updated Vanuatu National Energy Roadmap 2016-2020 | 30% of BAU by 2030 | 100% by 2030 |

Sources: [UNFCCC 2015](#); [Partnership on Transparency](#)

These small nations are demonstrating that a low-emissions pathway is well underway. PICs are implementing projects that increase energy efficiency and build renewable energy portfolios that include hydropower, solar photovoltaics (distributed and grid), geothermal, and biofuels, depending on the resources available.

The transition to renewables is not without [challenges](#). Small island nations face high barriers to entry for renewable energy, particularly high initial costs of installation, lack of private sector investment, and regulatory hurdles. Many lack a reliable grid system on which to expand. Their small size and isolated nature make it difficult to build, operate, and maintain renewable energy systems. Islands are separated and inter-island transportation for repairs and materials is expensive. Even the physical environment stresses electronics and equipment, requiring more frequent repair and replacement.

Tonga: A Case Study in High Ambition

Tonga is a mid-sized PIC with a diverse geography. Its 176 islands comprised of five groups contain high volcanic islands, raised limestone islands, and low-lying atolls (see box). It faces many of the same challenges as other PICs with a heavy reliance on imported diesel fuel, which accounts for a quarter of imports and about [10% of GDP](#) (USD\$41 million). Yet, it has been a leader in the region on promoting renewable energy.

[Tonga has championed the transition to renewable energy and low carbon development](#) for over 20 years. The country accelerated toward these goals in 2010, when Tonga developed the [Tonga Energy Road Map \(TERM\)](#), supported by the International Renewable Energy Agency (IRENA).² TERM outlines a 10 year national strategy for building a more resilient, renewable energy system by 2020. Leveraging this plan has allowed Tonga to signal to development partners that the country intends to focus on renewable energy investments.



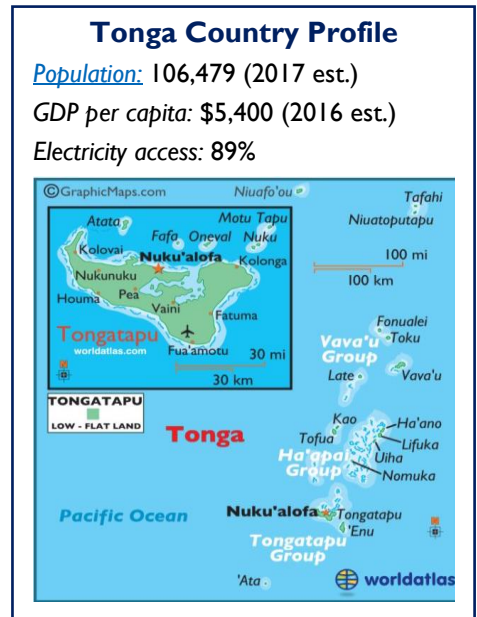
Picture 3. Ha Mai Solar Facility on the island of Ha'apai – the first island in Tonga to reach 50% renewable energy (Tonga Power)

As of 2010, 75% of the [fuel mix in Tonga](#) was from imported petroleum products and 25% from biomass and off-grid solar PV. In 2015, Tonga announced ambitious renewable energy targets in its INDC submission: 50% by 2020, 70% by 2030, and 100% by 2035. These targets are backed by high-level political support.

With promising opportunities for biomass, wave energy, wind, and solar power, Tonga has channeled external development assistance into building renewable energy capacity, improving grid stability, and upgrading grid networks. Notable initiatives are summarized in Table 2.

The speed of renewable energy investment spurred by TERM has gained widespread attention. The Pacific Islands Forum Secretariat highlighted TERM as a model for how small islands should conduct renewable energy planning and used Tonga as an example for regional and global learning. In 2017, Tonga's success in pursuing its renewable energy agenda was recognized by Pacific Energy Ministers through the establishment of the [Pacific Centre for Renewable Energy and Energy Efficiency \(PCREEE\)](#) in Tonga's capital.

PCREEE aims to support PICs' improved access to modern, affordable, and reliable energy services and bolster energy security by promoting renewable energy and energy efficiency investments, markets, and industries. PCREEE will be a crucial vehicle for accelerating progress towards PICs renewable energy and energy efficiency targets. The Center will also act as a facilitator for innovative partnerships with the private sector and spread lessons learned from the energy transition in the Pacific.



² <http://www.irena.org/newsroom/articles/2009/Sep/IRENA-Supports-Tongas-Transition-to-Renewable-Energy>

Table 2. Sample of Renewable Energy Projects in Tonga

| Year | Name and Description | Location | Development Assistance |
|---------------------|---|-------------------------|---|
| 2012 | Maama Mai Solar Farm 1.3MW (Popua) | Tongatapu | New Zealand Aid Programme |
| | Tonga Village Network Upgrade | Tongatapu | New Zealand Aid Programme |
| 2013 | La'a Lahi Solar Farm 0.42MW | Vava'u | United Arab Emirates |
| 2014 | Mata e La'a Solar Farm 1MW (Vaini) | Tongatapu | Japanese International Cooperation Agency (JICA) |
| | Solar Water Pump Phase 1: Installation of solar water pumps in 11 villages | Ha'apai | Pacific Islands GHG Abatement through Renewable Energy Project (PIGGAREP+) |
| 2015 | Solar Water Pump Phase 2: Installation of solar water pumps in 9 villages | Tongatapu | International Union for Conservation of Nature (IUCN) |
| 2016 | Pacific Renewable Energy Investment Facility – regional program, including Tonga, to increase renewable energy capacity | Pacific Regional | Asian Development Bank (ADB) and Green Climate Fund (GCF) |
| 2017 | Solar Independent Power Producer (IPP) 2MW | Tongatapu | China |
| | Outer Island Renewable Energy Project – Huelo e La'a Solar Farm 200kW | 'Eua | ADB |
| | Outer Island Renewable Energy Project – Huelo e La'a Solar Farm 550kW | Ha'apai | ADB |
| | Outer Island Renewable Energy Project – 4 x 80kW solar mini grids + 1 x 122kW (Nomuka, Ha'afeva, 'Uiha, Ha'ano, Niuatoputapu) | Ha'apai Niuatoputapu | ADB |
| | Outer Island Renewable Energy Project – Solar battery for solar home systems in Niufo'ou | Niufo'ou | ADB |
| | Rural and Remote Communities Solar Electrification Project – installed water pumps and deep freezers to combat climate impacts | Vava'u and Ha'apai | Japan through the Pacific Island Forum Secretariat and Pacific Environment Community Fund |
| | Wind Farm 1.3MW (Niuatoua) | Tongatapu | JICA |
| Planned 2018 | Nuku'alofa Village Network Upgrade | Tongatapu | New Zealand Government |

Sources: [IRENA](#); [Tonga Power](#); [ADB](#); Tonga Ministry of Environment, Energy, Climate Change, Disaster Management, Meteorology, Information and Communication

Summary: Small Islands, Large Commitment

SIDS are rapidly emerging as forerunners in the transition to renewable, low-emission energy production. Their desire to contribute to GHG mitigation is driven by a stark realization of their vulnerability to the climate risks faced in a warmer world. There is also pragmatism in this transition to reduce energy costs and enhance supply reliability. The lessons learned from their efforts demonstrate that setting ambitious targets and comprehensive energy planning can attract investment in low-carbon energy initiatives. Ultimately, these lessons will be shared through increasingly-visible regional centers, such as the PCREEE in the Pacific, and global island networks such as the AOSIS-led [SIDS Dock](#). Insights from the Pacific Islands can be applied to help other nations striving to accelerate low-emissions development.

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Published March 2018
Prepared by ICF under the USAID Resources to Advance LEDS Implementation (RALI) activity. Visit: climatelinks.org/projects/rali
Period of Performance: 2014-2019