



## Mandate Spotlight: 017 Nauru

## Feasibility Studies to Inform the Nauru Renewable Energy Road Map

**Location:** Nauru

**Beneficiary:** Department of Commerce, Industry & Environment (DCIE), Government of the Republic of Nauru

**Consultant:** CPCS Transcom Ltd., with ARUP and Econoler

**Start Date:** November 2019

**End Date:** November 2020

**CTIF Contribution:** CAD \$222,350

### Context

Nauru is turning to green, renewable energy as a driver of clean growth and as a means for reducing the share of public resources invested in diesel-fired electricity generation. While CO<sub>2</sub> emissions declined from a high of 14.6 metric tons per capita in 1986 to just over 4 metric tons in 2014, Nauru remains heavily dependent on imported fossil fuels, much of which is used for diesel-fired power plants. Household electricity customers also benefit from low tariffs compared to those charged to public and private sector consumers. Dependency on such traditional sources of energy therefore act as a drain on scarce public and private funds and is not sustainable over the long-term. Fortunately, however, Nauru is in an excellent position to better leverage accessible, low-cost renewable energy resources such as the sun and would also like to explore other alternative renewable sources to increase its energy mix. Significantly improving the efficiency of Nauru's energy use also offers economic and social benefits and is considered a priority in the country's long-term development strategy. For this reason, the next iteration of the Nauru Energy Road Map (NERM) for the period beginning in 2021 is anticipated to focus on the achievement of reliable, 24/7 grid-connected electricity supply powered 100% by renewable energy sources. Nauru expects to achieve the current NERM 2018-2020 target of 50% RE penetration as soon as a new solar plant financed by the Asian Development Bank becomes operational (see Figure 1).

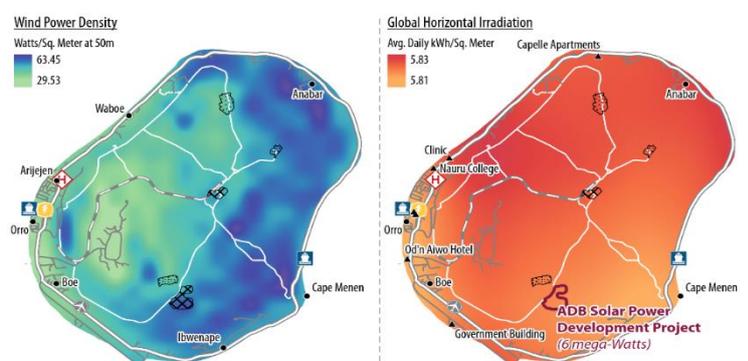
### Brief Description of the Mandate

In this context, the Government of Nauru's Department of Commerce, Industry & Environment (DCIE) requested technical assistance from CTIF to deliver feasibility studies that would inform the design of the next iteration of the NERM. These feasibility studies would document which sources of sustainable and socially responsible renewable energy, and means of harnessing them, should be the focus of national efforts to achieve the goals set out in the new NERM. These recommendations would be informed not only by financial considerations but also by the environmental, social and gender-related impacts of each energy source and electricity generation technology.

### Task 1: Background Report

The Canadian consulting firm selected by CTIF to implement this mandate, Ottawa's CPCS Transcom Ltd., first produced a background report on the renewable energy sources and energy generation technologies that would be the focus of the required feasibility studies. The report also considered the findings of recent or ongoing research, studies and projects carried out by other renewable energy initiatives on Nauru focused on similar objectives over the last five years.

Figure 1: Renewable energy potential in Nauru (image courtesy of CPCS)



### Task 2: Feasibility Studies of Selected RE Sources and Technology

Based on the findings of its initial report and in close collaboration with the DCIE, CTIF's consultant conducted a detailed assessment of the most financially viable, environmentally sustainable, and socially responsible sources of renewable electricity for Nauru. Due to COVID-19-related travel restrictions, the technical study was based on

premium satellite data, software simulations and ground data shared by DCIE. For each source of energy or energy generation technology, a consistent framework was used to assess the feasibility and included: (i) a resource assessment, (ii) a grid integration assessment, (iii) an environmental and social assessment, and (iv) a financial assessment. The consultant articulated reference projects for each technology and developed a financial model to assess financial viability. As shown in Figure 2, the results of the viability assessment were positive for all three technologies. The reference projects developed through this exercise can be used by DCIE in discussions with partners and donors when assessing future projects to be included in Nauru's renewable energy plans.

Figure 2: Results of Feasibility Studies Financial Assessment (graphic courtesy)

	Reference Project Capacity	Results				Impacts (vs Existing Diesel)	
		Project CAPEX	Annual Cost Reduction	LCOE	NPV	GHG Reduction/year	% Cost Savings
1	<b>Solar + Storage</b> 3.6 MW & 5.6 MW/ 22.3 MWh Solar PV & Battery	\$16.5m	\$1.45m	\$0.25/kwh	\$7.1m	4,165 tCO <sub>2</sub> e/kWh	51%
2	<b>Wind + Storage</b> 2 MW & 1.1 MW/ 2.2 MWh Wind & Battery	\$5.1m	\$0.4m	\$0.28/kwh	\$2.1m	1,501 tCO <sub>2</sub> e/kWh	59%
3	<b>Storage</b> 3.1 MW/ 6.2 MWh Battery	\$5.5m	\$0.2m	\$0.34/kwh	\$0.7m	989 tCO <sub>2</sub> e/kWh	71%

### Gender and Social Inclusion

Nauru has committed to mainstreaming gender equality across its ministries. However, translating these commitments into concrete actions in clean energy planning or programming has been slow due to lack of capacity, and since primary focus has been given to ensuring a stable and secure power supply across Nauru.

Among others, CTIF's consultant recommended the following steps be taken by the Government of Nauru to begin to address these gaps:

- Ensure that the deployment of clean energy infrastructure contributes to women's empowerment measures already outlined in other national policy documents.
- Ensure that equal and meaningful consultations of men, women and youth are included in planning the NERM.
- As part of the NERM, plan on training women, men, and youth to improve local capacity for managing and maintaining a sustainable energy sector.
- As much as possible, refer to sex-disaggregated data on energy use in the policy.

### Environment & Climate Change

A strategic environmental and social assessment was undertaken for each technology assessed.

- **Solar:** The most challenging impact to address is the disposal of solar panels at end of life or in case of malfunction.
- **Wind:** Primary impacts related to potential loss of biodiversity through bird collisions with hardware, or loss of vegetation due to land clearance.
- **Batteries:** Batteries are considered hazardous waste and would not be suitable for disposal in Nauru given the health and environmental risks

A climate risk assessment was also completed for Nauru's DCIE. CTIF's consultant calculated the vulnerability of Nauru Power System against 19 significant risk events. Six climate hazards were categorized as major vulnerabilities: storm surges, coastal erosion, sea level rise, heat waves, extreme rainfall, and fire. Finally, CTIF's consultant identified and prioritized four recommendations for improving Nauru's climate resilience.

- Assess flood risk and strengthen critical assets.
- Include climate risks in planning processes.
- Establish a Recovery Plan for the power system.
- Energy-efficiency and demand-response measures.