

# **Renewable Energy**

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## **Toward a 100% renewable island: A case study of Ometepe's energy mix**

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### **A B S T R A C T**

Despite generally having significant renewable energy potential, islands tend to depend on imported fossil fuels with volatile prices. This paper aims to provide technical inputs for reorganizing the energy planning for Ometepe Island. The result of the wind and solar resource assessments indicates wind power densities of 147 W/m<sup>2</sup> and 178 W/m<sup>2</sup> at elevations of 80m and 120 m, respectively, and an irradiation level of 5.3 kWh/m<sup>2</sup>/day. The estimated wind LCOEs are significantly lower than current diesel plant operating prices. Photovoltaic systems will probably become cost-effective 15 years from now for all non-subsidized end customers. However, it would be necessary to store energy to phase out diesel generation, and analyses were conducted to determine the possibility of a pumped-storage hydro plant. The annual biogas potential was estimated as ~550,000 Nm<sup>3</sup>, and in conjunction with electric stoves, it could be used to replace other fuels for cooking. Electric buses are an option for replacing the current diesel-run public buses, but advantageous financial conditions and reorganization of the bus schedules would be required. Also, a street lighting program was found to be cost-effective. The renewable energy transformation of the island might act as a role model for energy transition in Nicaragua.

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