Abstract

The largely government owned electricity sector in Haiti is facing a deep, permanent crisis characterized by dramatic shortages and the lowest coverage of electricity in the Western Hemisphere with only about 12.5% of the population having regular access to electricity. In addition, Haiti’s large share of thermal generation (70%) makes the country especially vulnerable to rising and unstable oil prices. The island however has abundant renewable energy sources. Haiti falls in the zone of the trade winds, with consistent wind directions and elevated wind speeds. In 2007, a first wind map was developed based on generic data. Based on this wind map a selection of promising sites was made by the Bureau des Mines (BME). Three final sites were selected to perform real on site measurements as a validation of the wind map. In total 8 measuring stations were installed. Two were installed in the northern part called Cap Haitien. Three 50 m towers were installed at Lac Azui near Port Au Prince and one on a mobile telecom tower as a back up. Finally two station were installed at Jacmel on the southern coast of the Island. Measurements were carried out for almost two years with almost 100% of data recovery thanks to the cooperation of mobile operator DIGICEL. The campaign was concluded in January 2010. The final report with concluding remarks was presented in Port Au Prince in June 2010.

The study shows that Haiti has promising wind resources in the northern part of the island and around the central lake. However the southern coast is often subject to hurricanes with very high extreme wind speeds and generally has low average values.

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Objectives

The objective of the study was to:

- Validate the wind resource assessment for Haiti in specific locations, based on measurements (wind map available)
- Estimate the feasibility for mid-scale and large-scale implementation of wind energy projects on three selected sites

Methods

A wind map for the country was prepared in 2006 based on satellite data.

The wind map showed good wind resources for the island in the northern part of the island and around the large lake called ‘Lake Azui’ bordering the Dominican Republic.

Based on this information the following steps were initiated:

- Selection and installation of 5 sets of wind measuring equipment on pre-selected sites
- Set-up of 3 back-up measurements on telecommunication masts
- Measurements at 8 locations during one year
- Analysis of the wind resources and modelling of the sites with MeteoDYN
- Analysis of extreme wind speeds
- Ranking & selection of project opportunities.

Results

Results Lac Azui

Figure 2: Monthly average wind speed and wind rose for one of the results near Lac Azui. The yearly average wind speed equals 5.7 m/s with a prevailing wind direction from the SSE

Results Cap Haitien

Figure 3: Monthly average wind speed and wind rose for one of the results near Cap Haitien. The yearly average wind speed equals 6.7 m/s with a prevailing wind direction from the SSE

Results Jacmel

Figure 4: Monthly average wind speed and wind rose for one of the results near Jacmel. The yearly average wind speed equals 5.6 m/s with a prevailing wind direction from the E

Remark: Although average wind speeds in Jacmel are low, a gust wind speed was measured in august 2008 of 51.6 m/s at 58 m height. The southern part of the island is frequently subject to hurricanes.

Conclusions

The wind resource in the southern part of the island is low and the installation of wind farms in that area is not to be envisaged.

The wind resource in the northern part is moderate to good and medium sized wind turbines are an option. The grid in these isolated areas are powered by diesel generators in the range of several MW and consequently the maximum wind power to be installed is limited.

The wind resources around the lake near the capital Port au Prince is good and wind power is certainly an option. The distance to the main utility grid is small and a medium sized wind farm in the range of 10-20 MW could be installed.

A more detailed analysis of the grid and other constraints is necessary before a final decision could be made.

References

1. ATLAS ÉOLIEN D’HAÏTI, Bureau d’Etude WINERGY, 2006