

## Effect of atmospheric stability for wind resource assessment.

Analyzing the area of Esperanza, Dominican Republic concerning its quality to build a Wind farm the phenomenon of atmospheric stability occurred.

The area of Esperanza is located in the north of Dominican Republic. Esperanza is a flat Valley in which the project area is situated in about 5 km distance south of the Mountain.

The expected average wind speed measures about 6.5 m/s from 135°.

The Company EGE Haina is planning a Windfarm of 30 Windmills in an area of round about 14 Km<sup>2</sup>

To describe the behavior of air parcels in the atmosphere there need to be differentiated between two types of air parcels, stable and unstable. Basically an air mass is considered as unstable when it rises on its own. If the air mass tends to stay in the same position or to sink it is stable.

If an air mass that rises on its own is cooling faster than the air by which it is surrounded it descends or rather stays. However air masses that cool slower than the air surrounding rise and keep rising because of its minor density

Uncontrolled rising air parcels cause turbulences in the atmosphere that in turn can provoke a movement of the rotor and

The effect of atmospheric stability appeared in Esperanza in the form of the behavior of the wind speed showing an abnormality in increasing height. Using the "Windcube v2" to measure the wind speed in twelve different heights it appears that in a multiplicity of measurement series the wind speed subsides with ascending heights between 50 and 80 meter to than intensify abruptly between 80 and 95 meters. From 100 meter height the behavior of the wind speed proceeds as expected.

Atmospheric stability is a phenomenon that usually appears in heights above 1000m. But as it seems there are turbulences in lower heights caused by atmospheric stability as well. It is now being investigated under which circumstances the phenomenon occurs and what consequences need to be taken to provide measuring errors and subsequent damages on the generators.

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