



Modeling and Assessment of Wind Energy Potential in the Cartagena City

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Abstract : Through the years, new sources of renewable energy are investigated to replace the energy obtained from fossil fuels; it is important to analyze the wind profile to develop alternative energy projects. Colombia is part of the countries implementing such practices; in particular the city of Cartagena by its geographical location, to determine the wind potential to generate electricity. Modeling and simulation of production of electrical energy generated from wind was carried out, as well as its economic assessment to establish viability in the implementation of wind as a renewable energy source. Data of speed and direction of wind, and temperature and humidity of the air were collected daily during 8 months using a weather station (PCE-FWS 20) located in the tower of the University of Cartagena. The average wind speed was of 4.00 m/s with values between 2.38 and 6.14 m/s, which were adjusted to the probabilistic model of Weibull. The results show that in the city of Cartagena can be generated from 180.28 to 838.23 MWh / year, depending on the power of the wind turbine (500-3000 kW) at a height of 40 meters. The economic analysis indicates that the wind turbine Vestas 3000 KW had the lowest cost of generation with \$ 385.97 / KWh, which was considered attractive for the financial indicators of the project.

Keywords: Wind energy, modeling and simulation, wind turbines, alternative energy.

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