

Height Analysis For Site Selection Of Wind Potentiality In Bangladesh

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Abstract: This paper tries to observe the site potentiality with respect to wind velocity for various height conditions in Bangladesh. From the analysis, it is seen that around 42.19% higher wind velocity is obtained in Cox's bazaar than the wind velocity of Dhaka location for 50 m height.

Index Terms: Wind velocity, wind power, power situation in Bangladesh, site selection, height.

I. INTRODUCTION

In Bangladesh there is a huge potentiality for the wind power. To investigate the wind potentiality in Bangladesh, wind velocity data for various locations with height basis are collected. From the data analysis, it is observed that, Dhaka is demanding a little bit lower potentiality with respect to other three locations. Again it is seen that wind power potentiality is growing with the height increment.

II. WIND POWER POTENTIAL IN BANGLADESH

For geographical position of Bangladesh wind power system has a good potential. Bangladesh Power Development Board (BPDB) and Local Government Engineering Department (LGED) have committed lots of research work on wind power system. There is a project in Muhuri which have a rated capacity of 0.99 MW [1]. Wind is the world's fastest growing energy source today and it has been retaining this position consecutively for the last stalled capacity is 1, 76,470 MW in 2011. Over 73% of the global installations are in Europe. Germany is the European leader, followed by Spain and Denmark [2], [3].

Considering diurnal variation of wind velocities and available wind speed pattern [4], the existing diesel generation can be partially replaced by Wind Energy Conversion Systems (WECS) and also new wind-solar hybrids can be set up. Bangladesh has a 724 km long coast line and many small islands in the Bay of Bengal, where strong south-westerly trade wind and sea -breeze blow in the summer months and there is gentle north -easterly trade wind and land breeze in winter months [6]. Along the coastal area of Bangladesh, the annual average wind speed at 30m height is more than 5 m/s [5]. Wind speed in northeastern parts in Bangladesh is above 4.5 m/s while for the other parts of the country wind speed is around 3.5 m/s [5, 7].

III. DATA ANALYSIS FOR SITE SELECTION IN BANGLADESH

For determining the site potentiality in Bangladesh, wind velocity data are collected for various heights considerations in various locations of Bangladesh. The data is taken from NASA website considering ten years data (July 1983-June 1993). From the height analysis, three various types of figures are obtained. From fig. 1, it is observed that maximum average wind velocity is existing in Cox's bazaar which is 3.64 m/s whereas second maximum average velocity is 3.55 m/s in Kutubdia for the height of 50 m. Again from fig. 2, it is observed that the lowest average wind velocity is 2.56 m/s in Dhaka whereas the maximum average wind velocity is 4.04 m/s in Cox's bazaar for the height of 100 m. Finally from fig. 3, it is seen that the maximum average wind velocity is 4.30 m/s in Cox's bazaar and lowest average wind velocity is 3.02 m/s in Dhaka city for the height of 150m. So from fig. 1 to fig. 3, it is observed that the most wind power potentiality is existing in Cox's bazaar with respect of other three locations.

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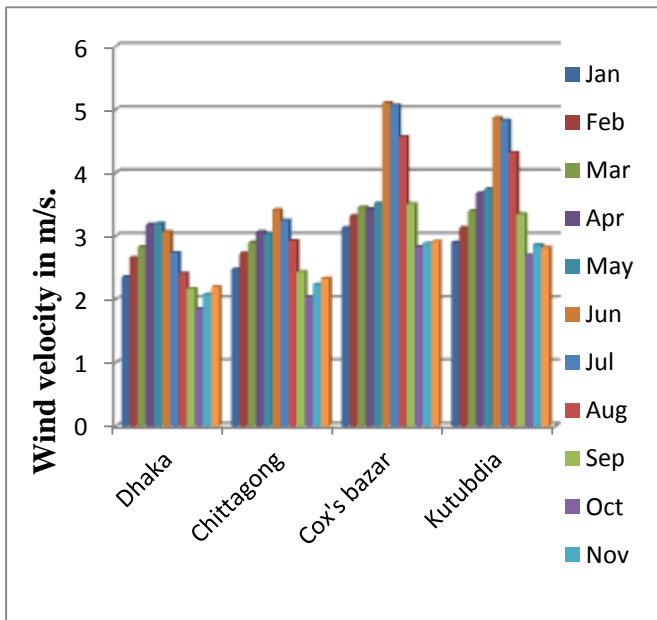


Fig. 1: Monthly average Wind velocity taking 10 years average for the height of 50m.

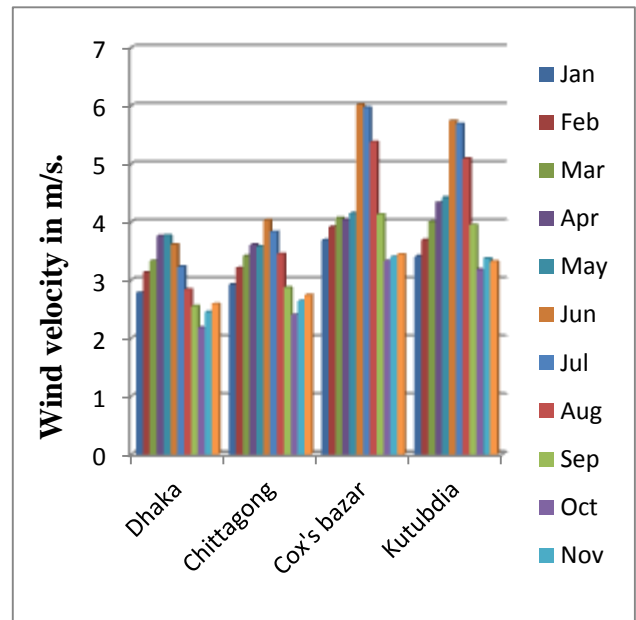


Fig. 3: Monthly average Wind velocity taking 10 years average for the height of 150m.

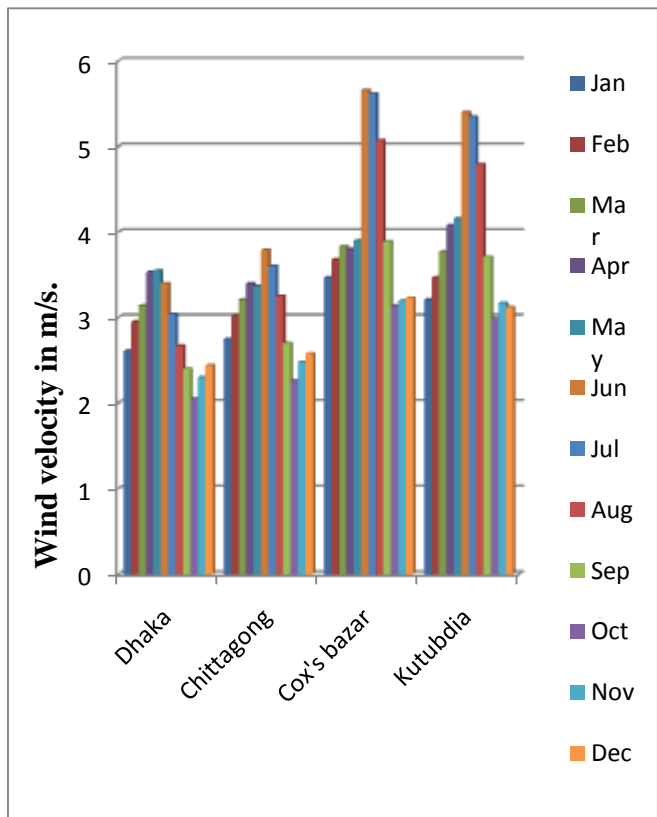


Fig. 2 : Monthly average Wind velocity taking 10 years average for the height of 100m.

Conclusion

The maximum wind power depends upon greatly on the wind velocity. Again this wind velocity is greatly depending upon the height. For this reason, the height analysis is done for determining the site selection in Bangladesh. From the analysis, it is seen that around 17.97% more velocity can be obtained if the height is developed from 50m to 150m in Chittagong.

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