

# Investigating the Performance of Experimental Model of Wind Farms with Alternating Heights

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**Abstract**—This work has been done by B.Tech and M.Tech students and studied a cluster of six Savonius wind turbines model and fabricated and two rows of these wind turbines has been kept. The height of these wind rotors are variable i.e. height of first and third wind rotor in a row are same and the height of the second wind rotor are different. It has been observed that in this experimental model the power obtained from previous experimental model having same heights are less than the power obtained from the experimental model of savonius rotors having alternate heights. The power obtained from the models (having alternate heights) kept in an angle to the direction of flow gives more power than the earlier one. It gives more power in the case when the models are kept in an inclined manner having alternate model heights. The bigger models have the dimensions of 21.5 cm and 10 cm bucket diameter and smaller models have 16 cm diameter and 8 cm bucket diameter. This type of wind farms may be very useful for production of electricity and water pumping. In rural area, where there is less electricity and less power generation the construction of the wind farms made concluded these studies may be very useful.

## 1. INTRODUCTION

These days wind farm are used for irrigation purpose in world. But in India much research is needed in the field of wind farm. This work is done for the purpose of erecting original wind farm. Some preliminary idea of Savonius wind turbine and its working principle has been taken from the reference [1,2,3,4,5] and later on the following types of experimental model has been fabricated. Some figures has been given in this paper.



Fig.1 : Straight line Arrangement in Single Row.



Fig. 2: Inclined arrangement in single row.



Fig. 3: Cluster arrangement in single row



Fig. 4: Straight line arrangement in double row



**Fig. 5: Inclined arrangement in double row.**



**Fig. 6 : Cluster arrangement in double row**

**Table1: Speeds for small, large and small blade resp. for single row**

Single row	Small(rpm)	Large (rpm)	Small(rpm)
Straight	672	430	140
Inclined	700	550	0
Cluster	661	590	300

**Table 2: Speeds for large, small and large blade resp for single row**

Single row	Large (rpm)	Small(rpm)	Large (rpm)
Straight	300	200	80
inclined	800	200	500
cluster	870	470	340

**Table 3: Speeds for small, large and large blade resp. for single row**

Single row	Small(rpm)	Large(rpm)	Large(rpm)
Straight	800	550	280
Inclined	880	640	400
Cluster	900	750	554

From the above photographs and some tabulated results it is clear that savonius turbine kept in an inclined manner to the direction of flow of air (having variation in the heights of alternate savonius wind rotors) will produce more power than when savonius wind turbines are kept in a straight line and along the direction of flow of air.

**2. CONCLUSIONS**

It has been observed that in this experimental model the power obtained from previous experimental model having same heights are less than the power obtained from the experimental model of savonius rotors having alternate heights. The power obtained from the models(having alternate heights) kept in an angle to the direction of flow gives more power than the earlier one. It gives more power in the case when the models are kept in an inclined manner having alternate model heights. The bigger models have the dimensions of 21.5 cm and 10 cm bucket diameter and smaller models have 16 cm diameter and 8 cm bucket diameter.

This type of wind farms may be very useful for production of electricity and water pumping. In rural area , where there is less electricity and less power generation the construction of the wind farms made concluded these studies may be very useful.

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