

Harnessing low power wind energy from riverine and isolated potential pockets using wound rotor induction machines

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At present the harnessing of the wind energy is focused at highly potential wind sites where the average wind speed is high (>7m/s). However, in many undeveloped and even developing countries, there is no electrical power supply at all or there is no regular electrical power supply in vast areas. For example, in India, there are 80,000 villages which are still not electrified and connection of 18,000 remote villages are not commercial viable. Furthermore, there is 27% average power loss in the transmission and distribution lines. The situations in African and many South-East Asian counties are not different.

Therefore, generation of electrical power locally, and preferably from the renewable energy sources which do not pollute the atmosphere, is a viable solution. Moreover, the most population of the world is settled at the bank of rivers and in river planes (riverine). Often these areas are away from sea coast with little wind power. However, there is a silver lining that some geographical conditions and topology cause acceleration in wind speed. It includes crest of a hill, funnel effect and ridge oriented perpendicularly.

In this work, the Gangetic plane of River Ganga is selected for potential wind energy pockets and locations. The river becomes wide, forms several kilometer wide small and wide islands at different locations between Moradabad to Bhagalpur. It resembles a narrow bay of sea and due to this type of typical topography (like sea and coast), wind speed increase at such riverine.

Therefore, for harnessing the low wind power, both stand alone and grid-tie schemes are proposed. A low cost wound-rotor induction machine based system and flexible ac asynchronous link (FASAL) grid-tie system are used. Both systems are tested successfully.

Biography

M. S. Jamil Asghar is a Professor in the Department of Electrical Engineering, Aligarh Muslim University, Aligarh, India since 1999. He has established the Centre of Renewable Energy funded by Government of India. He is author of Power Electronics (Prentice-Hall of India) and is a Chapter author of Power Electronics Handbook (Elsevier). He has several patents to his credit and published more than sixty papers.

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