



Green Rameswaram - Wind Energy

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Our earlier notes focused more on Solar Energy, apart from energy efficiency. In the last blog other forms of renewable energy were also indicated. In this blog we will explore more about these.

Wind Energy:

Wind is an important source of renewable energy, In fact in India wind energy is the leading source of renewable. Particularly Tamilnadu is the leading exponent of wind energy, richly harvesting the abundant wind power available in the Aralvoimozhi, Sengottai and Palakkad passes in the western ghats. These are the gaps (passes) in the western mountain ranges and during south west monsoon (June - August) wind gushes through these gaps to be converted into energy TN has about 7300 MW of installed generation capacity from wind. Tirupathi/Tirumala in the eastern range and other gaps in the western mountain regions are good sources of energy.



It is also a pity that only about 3800 MW of actual generation is being tapped by Tamil Nadu grid. The transmission system is not adequate to evacuate the power generated and pass it on to other grids because of lack of good network. One can hear complaints from wind energy producers that the evacuation is totally absent during night times as the additional power cannot be used or transported to other states or grids. The overall PLF (Plant Load Factor) is not very good and there are lot heartburns in the industry on this score.



The author has been advocating off shore wind generation systems for a long time and only recently some talks are ON about this. The wind regime is generally very good deeper into the sea and India with a long coastline have not done much in this area, unlike the Scandinavian countries. Power plants of rating of about 5 MW are quite common in these countries. Also the availability of high speed wind is not monsoon dependent and continuous, With talks happening on a series of desalination plants along the coastal areas, installation of off shore Wind Energy Power

Systems would ensure the availability of regular power supply for the highly energy intensive industry.

The wind generators in the ratings 250 kW to 2000 kW that are deployed in wind farms are of Axial Turbine type. There are three blades, like in a ceiling fan and these garner the axial winds very efficiently. But only high speed winds about 4 m/sec are converted by these turbines. In fact a 2 blade turbine would be more efficient in the axial types. While induction generators were used in



the earlier versions, the modern plant invariably uses Permanent Magnet synchronous generators, which can be easily tied to the power grid. The earlier induction type systems require a live grid to which the generator is to be connected. The generator is directly connected to the turbine with a gear box. Stand alone systems can also be produced.

Rooftop Micro Wind Generators: Another important domain which has been totally neglected in wind energy is the rooftop micro models. As against the axial type turbines the micro wind systems invariably use vertical turbines. The footprint is lower and these can be mounted vertically along the pillars in a RCC building. Also the generator is placed at the bottom of the structure with easy access and reduced costs. The vertical turbine can harness low power winds from about 2 m/sec. The plant power rating is mostly in the range of around 0.5 ~ 2 kW and this is more than sufficient for homes and public places. No land area is required for these systems. Further work is happening in designing such turbines to improve the yield and efficiency. India with a long coastline has adequate wind regime in the lower speeds and further work is required to harness this form of renewable energy.

