Annexure -1

A BRIEF NOTE ON THE PROJECT

INTRODUCTION:

Electricity is an essential requirement for all facets of our life and has been recognized as a basic human need. It is the critical infrastructure on which the socio-economic development of the country depends. The growth of the economy and its global competitiveness hinges on the availability of reliable and quality power at competitive rates.

The demand of power in India is enormous and is growing steadily. Though substantial development has taken place in the Generation capacity addition, at present, a lot more needs to be done. On the flip side the energy shortage has been increasing consistently, with the present figure standing at 11%. The gap between the Supply and Demand is increasing day by day leading to widespread shortages, power cuts etc., seriously effecting the economic growth of the country and at times even leading to violent protests, attack on State Electricity Board's personnel etc. The vast Indian power market, today offers one of the highest growth opportunities for private developers.

India is endowed with a wealth of rich natural resources and sources of energy. Resources for power generation are unevenly dispersed across the country. This can be appropriately and optimally utilized to make available reliable supply of electricity to each and every household. Electricity is considered key driver for targeted 8 to 10% economic growth of India. Electricity supply at globally competitive rates would also make economic activity in the country competitive in the globalized environment.

The Conventional Power Projects like Hydel, Thermal, Gas based Power Plants operate on depleting sources of Fuels and are known for their adverse consequences on the Environment, Human habituate. Besides, attracting litigations from the Public on various fronts, the conventional projects call for huge requirement of land with rehabilitation, displacement etc. Considering all the jeopardizes encountered with the conventional power projects, renewable energy has started gaining importance and will be the most appreciated form of Energy in the days to come.

India is blessed with an abundance of wind, sunlight, water and biomass. Vigorous efforts during the past two decades are now bearing fruit as people in all walks of life are more aware of the benefits of renewable energy, especially decentralized energy where required in villages and in urban or semi-urban centers. India has the world's largest programme for renewable energy.

The Advantages of Renewable Energy being it is Perennial, Available locally and does not need elaborate arrangements for transport, Usually, modular in nature ,i.e, small units and system can be almost economical as Large scaled ones, Environment friendly and Well suited for decentralized application and use in remote areas.

In the Renewable energy sector Wind Energy is considered to be the most viable source. Evolving itself from a mere water pumping device in the ancient days wind energy converter has now metamorphosis into a generator producing electricity of grid quality. Benefits of wind power are enormous and to name a few, pollution free, it occupies comparatively less space, requires minimum maintenance etc.

Wind Power Sector is the fastest growing sector in renewable energy development as well as offers biggest potential among all other renewable segments. In progress are wind resource assessment programme, wind monitoring, wind mapping, covering 800 stations in 24 states in operations. Altogether 13 states of India have a net potential of about 45000 MW.

India now ranks as a "wind superpower" with an installed wind power capacity of 17351 MW till the end of April 2012. Electricity generated fed to the national grid. Being able to feed wind power to the grid has helped reduction in losses and strengthening of the grid. India's wind resources are among those major renewable resources that are non-polluting and clean. Wind energy is also cost effective and highly suitable of the several other energy resources

SITE INTRODUCTION:

The present site proposed will be named as JOGIHALLY PROJECT which, the area of has been identified by Vish Wind Infrastructure LLP, for developing Wind Farm Project. The proposed area for the Wind Power Project falls in parts of Kudligi and Jagalur Taluks of Bellary and Davanagere Districts respectively. The sites are hilly terrain having plateaus with Minimum differential height of 100 to 150m from surrounding ground level.

The Energy Department, Govt. of Karnataka has accorded approval for setting up Wind Power Project vide GOs EN 302 NCE 2006 dated 16.10.2006, EN 302 NCE 2011 dated 7.01.2012 and EN 128 NCE 2013 dated: 30.05.2013. The site is located in the forest lands falling in Kudligi and Jagalur Taluks of Bellary and Davanagere Districts respectively. The villages covering the proposed sites are as detailed below.

Sl. No.	Site Name	Range	Villages	Geo Coordinates
1	**JOGIHALLY PROJECT**	Kudligi & Jagalur	Nimbalagiri, Byluthumaraguddi, Bellekatte, Harakabhavi, Palayanakote, Suladahalli, Mangapuram, Chikkaujjini, Jayaramanahalli, Kyasenahalli, Byatagaranahalli, Lakkenahalli, Tamdihalli, Gudugobanahalli, Hanabenayakanahalli, Gowdagondanahalli, Veeravvanagathihalli,	Lat-14° 45' 21.70", 14° 45' 18.88" Long-76° 18' 9.20", 76° 26' 5.28" Lat-14° 34' 30.17", 14° 34' 27.39" Long-76° 18' 5.34", 76° 26' 1.04"

SIZE OF THE PROJECT:

This project is planned to be with a total capacity of 104.8 MW comprises of 131 numbers of wind energy converters with 0.8 MW capacity. The towers for the wind energy converters (WEC's) will be of 75 Meters height and the Rotor diameter of the blade is of 53 Meters.

EXTENT OF LAND REQUIRED:

The Areas identified for the proposed project are forest lands falling in Kudligi and Jagalur Taluks of Bellary and Davanagere Dist. Detailed purpose wise breakups of the lands required are as mentioned in **Annexure 2**. The extent of forest lands required for the projects are arrived at by considering the 50 X 50 sq. meters area for each WEC Corridor and 13 Mts wind farm road, 8 Mtrs and 15 Mtrs internal and external line, SCADA cable between two WECs.

An area of 15x20 sq. meters each is considered for Metering/VCB yards and control rooms wherever required. Approach roads to the wind farm sites are considered

with 13 meters width and 8 and 15 meters width of Right of Way Corridor for External SCOH/DCOH line. Considering all these parameters the requirement of land will be 190 ha for setting up of 104.8 MW capacities consisting of 131 numbers of 0.8 MW WEC's.

SURVEY DETAILS:

System Intelligent Total Station has carried out contour survey with 2 m contour intervals. For contouring 80 m on either side of the ridge is considered.

All the individual locations are interconnected by intra farm road, which were aligned in 1 in 18 gradients depending on the terrain nature on hills. A minimum clear width of 13 m should be provided for movement of trailers and cranes. For the site of 0.8 MW WECs, a width of 35 m radius is provided in all the curves. Along the road side, drainage of size 0.50m x 0.45m shall be provided.

COST OF THE PROJECT:

The total cost required to setup 104.8 MW Wind Power Project is Rs. 52400.00 Lakhs.

JUSTIFICATION FOR SELECTION OF THE SITE:

Two important reasons have prompted for considering this Hillock: -

1. The selected ridges are rocky in nature with vertical stratification. Barren, unfit for any growth of plants or trees, about 665 to 805 mts. height from the MSL, filled with huge Rocks, and virtually goes waste if not used for constructional purposes like Wind Power Projects.

2. Fortunately Karnataka has been gifted by the Nature with some of the very good windy sites in the Country. Exploring the possibilities of Potential wind sites in India are the Karnataka Renewable Energy Development Agency and C-WET have installed a wind mast for studying the wind pattern. This has yielded exemplary results with consistent wind speeds all along declaring these areas as one of the feasible wind sites in the state of Karnataka.

EMPLOYMENT LIKELY TO BE GENERATED:

Employment generation during the time of construction is directly 75 (Appox.) employees and indirectly at least 300 additional employees will be benefited.

BENEFICIARIES OF THE PROJECT:

Fuelled from the natural source of wind speeds, these projects do not demand the need for any other form of raw material/fuel for generation of Electricity and do not have any adverse effects on the surrounding environment, as they are non-polluting in nature. The area is degraded supporting spars growth with thorny bushes. Employment for the local people is created during the project implementation period and after completion as well, for maintenance of the wind energy converters. This Project is expected to cater to the complete power requirement to the public in the surrounding area and the State of Karnataka.

INFRASTRUCTURE REQUIRED:

Roads:

Separate approach roads are available for the each site from the existing road from where the new roads have to be formed leading to the Wind Farms for movement of Cranes, Trailors etc., up to the Machine locations. The road will be of 13 Meters Width, and will be maintained with a gradient of 1 in 16 to 1 in 18 all along. The internal network of the Roads is as shown in the respective drawings.

The roads will be properly compacted with adequate watering, rolling and drain is provided on one side of the road to prevent the soil erosion on the roads, as well as on the side of the roads.

Evacuation Scheme:

The power generated from the Wind Energy Converters on these ridges is planned to be evacuated in two stages: -

1.The First stage being that of the Internal interconnecting scheme, wherein, all the wind energy converters generating at low voltage is stepped up to 33 kV using a 33 kV Unit Transformer and are interconnected using a network of 33 kV Overhead lines suiting the site conditions as shown in the respective drawing. Groups of Wind Energy Converters are connected to a vacuum circuit breaker yard or protected by Horn Gap HT fuse provided in the Metering yards for protection of the respective group of wind energy converters against faults and measuring the energy generated is recorded for the billing purpose. This whole set up of the first stage is completely executed on top of the hill. The internal SCOH line connecting from one WEC to another WEC location is passing through the respective 8 and 15 meters corridors proposed for the WEC's wherever feasible.

2.The second stage is that, the energy after being recorded at the Metering Point is transmitted on 33kV over head lines to the proposed 33kV/ 220 kV Substation constructed near by the site. In the instant case the power will be evacuated to the State Power Grid.

CERTIFICATE OF DEMAND OF LAND FOR THE PROJECT IS MINIMUM

Wind farm consists of individual wind energy converters installed in a cluster along with the associated electrical like the overhead transmission line, circuit breakers, metering points, transformer yards, Site office/Statutory Building etc. The performance of the WEC is basically dependent of the type and speed of the wind at any given instant, which, in other words means; in order to have a better generation it is necessary to have a higher Wind speeds and in addition the winds are to be free from any turbulence and eddy currents. The effect of the turbulence on the WEC's has been successfully studied by various research organizations like RISOE Denmark, Germanischer Lloyds etc., and it has been found that it is necessary to place WECs at least 5D (diameter) of rotor. If the WECs are placed less than this distance, the churning action of one WEC rotor will induce turbulence on the winds, which will affect the performance of the other WEC. According to this principle, the WECs are placed at least 2 to 3 times the rotor diameter.

Approach roads are required to be formed from the nearest State/National Highway or MDR for the movement of heavy equipments to the wind farm sites. In order to suit the dimensions and the weight of individual equipments of WEC, the roads have been designed and the area is proposed. It is also necessary to provide space for installing the overhead transmission line, which interconnects all the WECs, affects the power to common pooled point called the Metering Point. This overhead transmission lines both, SCOH and DCOH are of 33 Kv in nature.

The total extent required for the project has been arrived at by considering the 50 X 50 sq. meters area for each WEC foundation, 13 Mts width corridor internal roads, 8 and 15 Mtrs internal line, SCADA cable, Metering/VCB yards and control rooms, 13 Mtr wide approach road from the main road with 35 mtr width at "U" turns/hair pin curves for turning of heavy vehicles.

A 220 KV Substation is to be constructed close to the Wind Farm. The power generated in the wind farm is evacuated in the Sub Station and same will be connected to nearby KPTCL S/S.

Hence the total area required for the project is as detailed under:

Sl. No	Land Required For	Area in Ha
1.	WEC Foundation	38.93
2.	Roads & Electrical lines, Curvature, VCB, Statutory Building (Within Corridor)	119.51
3.	Electrical lines, (SCOH, & DCOH) Minor road to developed (outside Corridor)	31.56
TOTAL		**190.00**

In total, for successfully completing and commissioning of 104.8 MW, a total land of 190 Ha is necessary, which translates in to 1.82Ha hectares per MW.

As per the industry norms and the Ministry of Non-convention Energy Sources / State nodal agency guidelines it is generally allowed up to 10.50 ha per MW. As against this, we have requested only 1.82Ha hectares per MW, which in our opinion is a very optimum.

Therefore, it is clear that all steps have been taken to ensure that an optimum layout is designed and accordingly land usage is kept at bare minimum.