

Feasibility Analysis of Roof Top Wind Mill for Construction Projects

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ABSTRACT: The construction projects today have become more complex and there is high unpredictability of parameters involved in project. Therefore there is a need of an hour to go for efficient value engineering opportunities to have sustainable development. The demand and supply analysis for electricity consumption is on peak and the demand for electricity is increasing day by day, therefore is a requirement for optimum utilization of renewable source of energies available. Therefore this paper deals with the feasibility analysis of roof top windmill Installation models for projects. This paper presents a detail report for the planning required to install these models.

KEYWORDS: Roof top Windmills, optimum utilization, Installation models.

I. INTRODUCTION

Interest for energy will undoubtedly increase with the expanded financial advancement in the nation. Indian economy is restoring after slow development over the most recent three years and expected to develop at quicker pace in the occasions to come. It will additionally push the interest of electricity in practically every one of the segments for example family unit, farming, business, institutional and modern division. Indian electricity area is prevailed by the petroleum derivative based warm power plants yet as of late we are moving towards the renewable energy to capture the GHG outflow. Sun powered and wind energy can assume a crucial job in providing spotless and environmentally friendly power energy. Present paper attempts to discover the job wind energy can play in the age blend of intensity segment in India. It attempts to appraise the all-out creation of wind energy by 2050 in India. Despite the fact that relapse condition is utilized for estimation, yet no measurable instrument is productive enough to appraise for such a significant stretch in future. In this way, individual estimation of all out wind control age is proposed to manage the arrangement producer and mechanical pioneers. It additionally attempts to discover potential effect of 'Make in India' on cost and social adequacy of wind energy.

The International Renewable Energy Agency (Irena) uncovered that expanding wind and sun oriented power sources to 36 percent would bring the objective of decreasing ozone harming substances fundamentally closer (Gifford, 2016). As Solar and wind energy can assume an imperative job in providing perfect and efficient power energy; present paper attempts to discover the job wind energy can play in the age blend of intensity part in India. It attempts to appraise the absolute generation of wind energy by 2050 in India. Prior to investigating the eventual fate of wind energy in India, let us talk about the variables great to wind energy in the nation.

II. OBJECTIVES OF THE PAPER

The Feasibility Analysis for Installation of Roof top Wind Mills in construction projects is the major objective of this paper.

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III. LITERATURE REVIEW

- **Krishna Kumar Karothiya, Amit Kumar tripathi, Sanjay kumar, S. Singh, “FEASIBILITY ANALYSIS OF ROOFTOP WIND TURBINE IN INDIA”, Research Gate**

The Rooftop Wind Turbine gives an alluring reasonable arrangement in the field of energy, with the advantage of safe condition for whom and what is to come. Low wind electric framework can make a huge commitment to our country's energy need. What's more, presently yet there is no such wind control age framework that can deliver energy and can satisfy the prerequisite of individual houses in India. Run of the mill wind turbines are adequately enormous to require huge space for their establishment and activity. Then again, littler turbine framework has required less territory and they can be for all intents and purposes introduced at top of the tall structures. In this work of wind control age into a tall structure plan, the principal thought must be the neighborhood wind atmosphere of the zone. For this we have gathered information for various areas in India and afterward dissect the power age limit of housetop wind turbine, power applied by the wind turbine framework on the structure. To check the practicality of housetop wind framework that convert wind energy into mechanical energy and produce electricity evaluated control as 700W in India and Selection of site for establishment of roof wind turbine with accessibility of least wind speed. This electric power can be utilized straightforwardly for family reason.

The world is confronting two energy related issues initially isn't having satisfactory and secure supplies of energy at moderate costs and second the ecological mischief brought about by devouring a lot of petroleum products. This has prompted expanding enthusiasm for interchange control/fuel research, for example, power module innovation, hydrogen fuel, bio methanol, biodiesel, sunlight based energy, geothermal energy, tidal energy and wind energy. Worldwide essential energy request is anticipated to increment at a normal pace of 1.6 %. The total populace is currently evaluated at 6.5 billion and is developing at a pace of 5% per annum expanding the utilization of energy. All things considered each individual in the created world needs about 10kWh of energy every day along these lines, if everybody could get this stockpile of energy, the world needs 65 billion kWh. Clearly the pattern will precede. Remembering that the inventory of petroleum products is as of now compelled to meet the present prerequisites and that the created nations realize that consuming of hydrocarbon powers must be diminished to forestall arrival of CO₂ and consequent risk of a dangerous atmospheric deviation.

- **UnggulWibawa, AkhmadFrandicahyaPermadi, RiniNurHasanah (2018),“A Micro-Scale Cyclone-Wind Turbine for Rooftop Ventilator”, Indonesian Journal of Electrical Engineering and Computer Science.**

This paper investigates the model of a violent wind turbine for a miniaturized scale wind control framework being spurred by a plan to collect the deserted energy from housetop ventilators. The framework viable has been prepared with a battery to shape a wind-battery control framework. Information got from a wind site perception has been utilized to figure the conceivably created power and effectiveness, just as the mechanical and electrical plans to extricate the energy. The plan has been investigated to get the best productivity of the violent wind turbine model. The effect of wind-speed minor departure from the come about framework yield has been explored during the charging procedure of battery. The end accentuates the connection between the yield control and the range estimations of the came about current and voltage, just as the ideal wind speed-scope of the violent wind turbine activity.

- **Mario Christiner, Ryan Dobbins, Arnold Ndegwa, John Sivak (2010), “Rooftop Wind Turbine Feasibility in Boston, Massachusetts”, Thesis project of WORCESTER POLYTECHNIC INSTITUTE.**

At present worldwide vitality use is at a record high and keeps on expanding. In the US, over 85% of vitality is acquired from petroleum products (US DOE, 2010). Given their moderate creation rate and the quick utilization, non-renewable energy sources are basically limited in amount. Expectations on the measure of time they will keep going for go from 42 to 102 years (Shafiee and Topal, 2009). Most researchers likewise concur that petroleum

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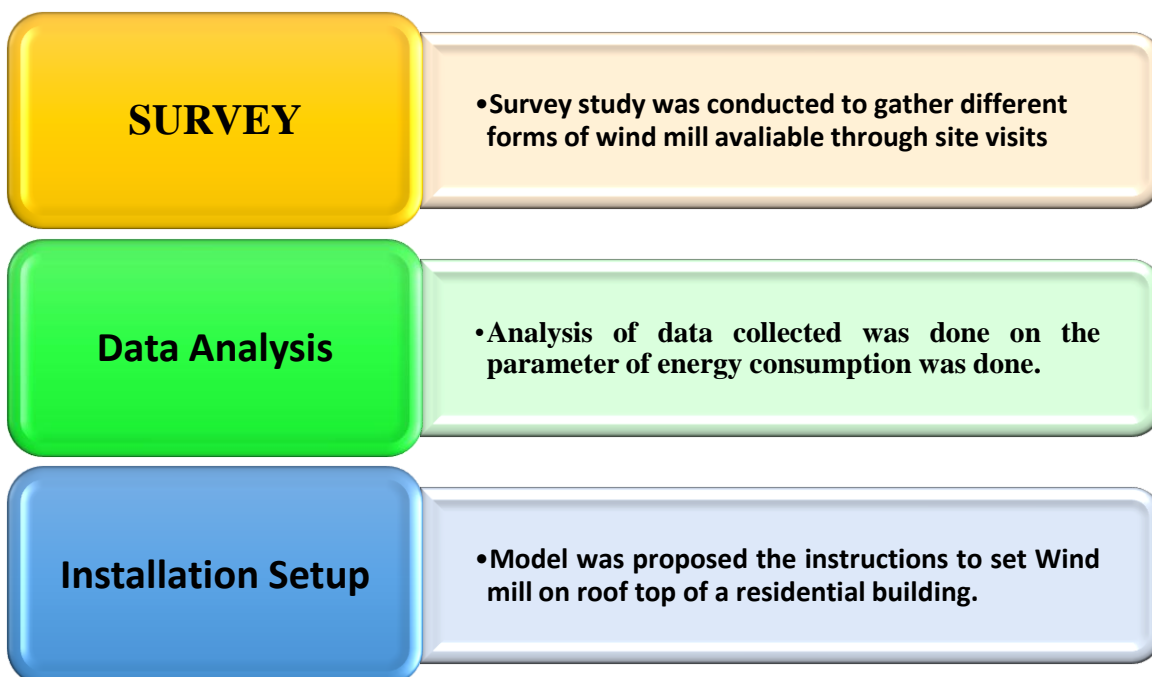
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derivatives cause contamination and harmfully affect the earth (Lvovsky, Hughes, Maddison, Ostro, and Pearce, 2000). To maintain a strategic distance from issues in the future, we should go to vitality sources, for example, sun based boards and wind turbines that are sustainable and naturally well disposed sources. Massachusetts is attempting to advance the utilization of sustainable power source with acts, for example, the Green Communities Act (GCA) which expects to have 20% of the state's electric vitality load delivered through inexhaustible sources by 2025. Massachusetts as of now has a few sustainable power source establishments all through the state, including wind, hydro, and sun based establishments, however it must keep on expanding its inexhaustible ability to satisfy the GCA necessity. One association inside Massachusetts that is attempting to expand improvement of all sustainable power sources is the Department of Energy Resources (DOER). Among different sources, the DOER is right now keen on the probability of housetop wind turbines in Boston, due to the city's inexhaustible beach front breeze assets and enormous electrical burdens. Housetop wind turbines might be an answer for a thick, urban zone where the open land required for bigger breeze turbines is nonexistent. All around the globe, huge breeze cultivates in country zones and off sea shores are creating a lot of vitality. These regions are prime areas for wind turbines because of the high wind speeds and good ways from populated regions. There is a lot of documentation on the significance, advantages, and difficulties concerning huge scale wind turbines. Right now, the breeze business is investigating the utilization of little scale wind turbines. In any case, since this is another improvement, little research has been done on their presentation. Housetop wind turbines in urban situations present one of kind difficulties. The nature of wind in a urban situation is mind boggling because of numerous blocks in the wind's way. Moreover, interfacing housetop wind turbines to changing sorts of electrical framework systems is testing. There is likewise constrained data on the social perspectives towards housetop wind turbines since they are not yet basic enough for any feelings to have been shaped. The constrained data on housetop wind turbines in urban conditions makes it hard to survey their incentives inside sustainable power source advertise.

IV. METHODOLOGY



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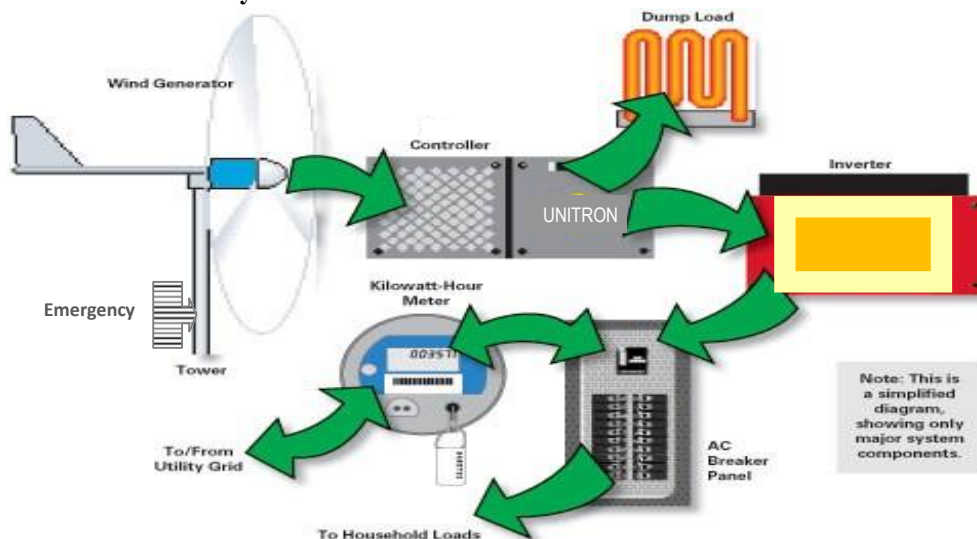
V. EXPERIMENTAL RESULTS

INSTRUCTIONS FOR ROOFTOP INSTALLATION

It is conceivable to Install Small Turbines on Roof Tops of the structure furnished the Construction is of RCC with level rooftop development. The Tower can be raised uniquely on unused segments (columns) on the rooftop top; the segment ought to be ideally halfway situated on the rooftop top not very near the parapet divider. By and large at any rate 30ft Tower is prescribed to fend off the breeze generator from rooftop top disturbance. The Triangular Lattice type development is suggested. Under ordinary working condition s there are known undue vibrations from the machine, however under incredibly high breezes and when the machine is in folding mode, there some vibration will undoubtedly get transmitted through the segment. In the event that the above vibration is worthy, you may introduce the pinnacle legitimately on the segment as Per the drawings and guidance connected, generally sandwich plate development with hostile to vibration mounting is proposed. The steel from the section is uncovered and extended a 300 x 300 x 10-15 MM steel plate will be welded on to the steel, and insect vibration cushions (AVM) fitted on the top surface, another Plate of 300 x 300 x 20 MM is set over the subterranean insect vibration cushions, the upper plate will have all the mounting game plans of situated in the triangular grid tower. Since hostile to vibration mounts can take any measure of vertical power according to the specs. however, not Shear power the equivalent must be captured by fellow ropes grapple as close as conceivable from The base of the pinnacle ideal person rope landing will be 120 degree to go inside with all the three Points of the base impression of the Triangular cross section, the detour blotches to be set up till erection is finished to stay away from strain on AVM s.

Roof Top Wind Mill Selection

Battery-less Grid-Tied Wind-Electric System



Unitron Roof Top Wind Mill Setup

Interfacing with the lattice without batteries is the most financially savvy and naturally amicable approach. You dispense with batteries, which are exorbitant, require upkeep, and convey a huge proficiency punishment particularly on the off chance that they are not appropriately measured the main downside of battery-less frameworks is that when the network is down, your framework closes down. Be that as it may, in most framework adjusted territories, utility blackouts are just a couple of hours a year—a little burden to suffer for the productivity, ecological invitingness, and frugality of these frameworks. There is no uncertainty the innovation of batteries have experienced ocean change with

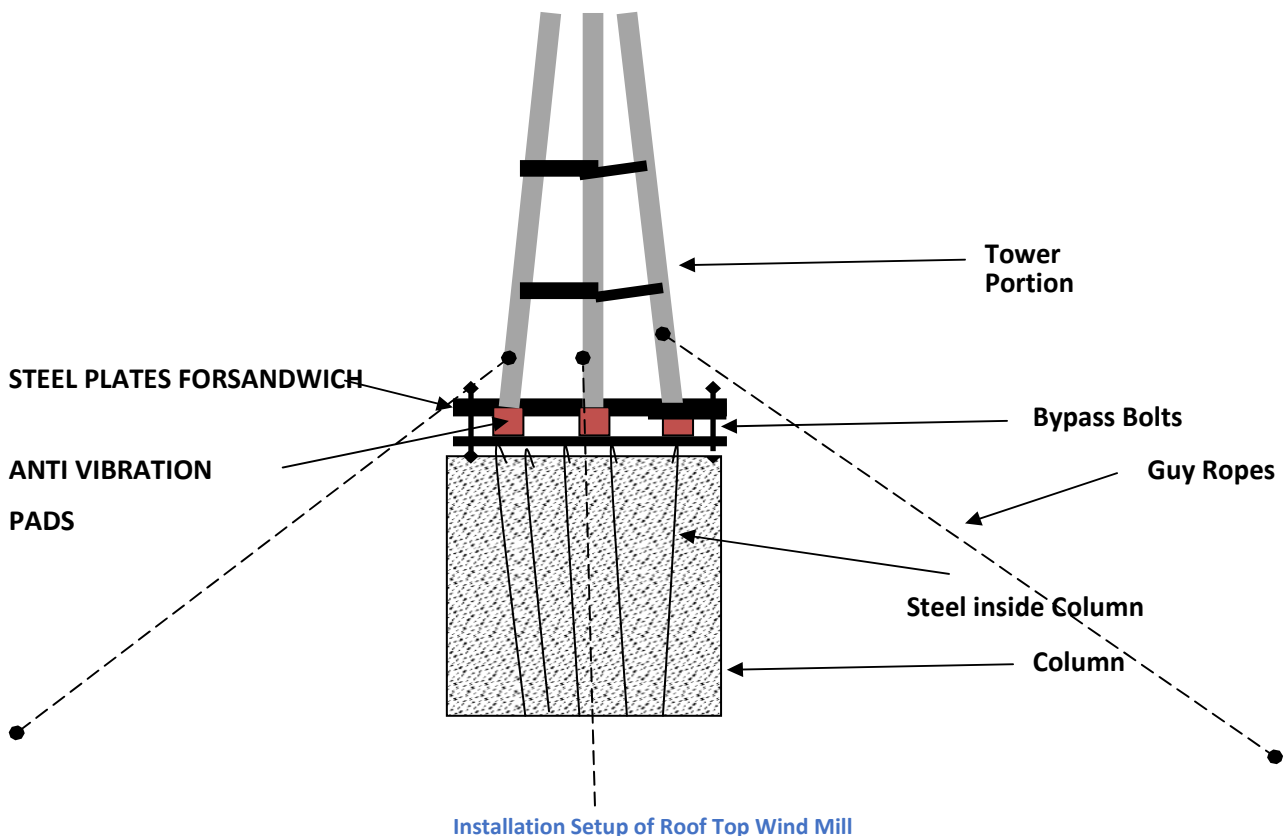
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more up to date materials and improved assembling forms the future of the batteries has gone up by as ten years, yet this comes at a strong sticker price. Battery-less network tie frameworks may see expanded execution (once in a while significantly) from the breeze turbine contrasted with battery-based frameworks.



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Specifications of Wind Mill of Unitron

UNITRON UE- 33/3.3 w			
Average Wind Speed			
MPH	M/s	KMPH	Monthly Generation kWh
9	4.0	14.5	269
10	4.5	16	362
11	4.9	17.7	476
12	5.4	19.3	568

UNITRON UE- 42 plus / 5.1kw			
Average Wind Speed			
MPH	M/s	KMPH	Monthly Generation kWh
9	4.0	14.5	380
10	4.5	16	500
11	4.9	17.7	660
12	5.4	19.3	885

UNITRON UE- 42/4.2 kw			
Average Wind Speed			
MPH	M/s	KMPH	Monthly Generation kWh
9	4.0	14.5	310
10	4.5	16	412
11	4.9	17.7	550
12	5.4	19.3	685

UNITRON UE- 6/650 w			
Average Wind Speed			
MPH	M/s	KMPH	Monthly Generation kWh
9	4.0	14.5	54
10	4.5	16	72
11	4.9	17.7	91
12	5.4	19.3	161

Wind data collection for different location in India

Month	Average wind speed (m/s) and location									
	Mumbai	Ghaziabad	Gonda	Aligarh	Mizoram (lawngtlai)	Leh (j&k)	Dharamshala	Belgaum (Karnataka)	Ahmedabad (Gujarat)	Chennai (tamilnadu)
Jan.	3.84	2.77	3.34	2.75	2.68	8.00	7.19	3.15	4.49	4.87
Feb.	4.66	3.13	3.60	3.11	2.87	7.93	7.06	3.13	4.57	4.46

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March.	5.10	3.46	3.74	3.34	2.87	7.89	6.87	3.78	4.59	4.45
April	5.62	3.87	4.05	3.82	2.84	6.79	6.67	4.06	5.02	4.49
May	5.67	4.02	4.36	4.16	2.79	6.69	7.00	4.62	5.83	4.86
June	5.64	4.11	4.16	4.35	3.57	6.84	6.97	5.52	5.33	5.52
July	6.46	3.39	3.46	3.66	3.48	6.57	5.57	5.78	4.72	5.30
August	5.84	2.91	3.06	3.09	3.19	6.49	5.34	5.28	4.18	5.24
Sep.	4.05	2.85	3.04	2.95	2.64	6.93	6.04	3.98	3.85	3.83
Oct.	3.48	2.16	2.87	2.21	2.23	7.15	7.00	3.39	3.52	3.56
Nov.	3.41	1.83	2.84	1.95	2.34	7.51	7.52	3.50	3.85	4.56
Dec.	3.45	2.40	3.11	2.41	2.46	8.16	7.58	3.47	4.15	5.28

VI. CONCLUSION

The analysis of roof top wind mill in residential projects states that the implementation of roof top wind mill depends upon the wind intensity in that area throughout the year, the energy demand of that residential building, the type of wind mills installed and their efficiency will lead to the energy efficient residential buildings and it is therefore important to consider all the factors.

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