

# International Journal of Innovative Research in Science, Engineering and Technology

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## Smart Wind Power Tracking System and Emergency Notify During Natural Disaster

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**ABSTRACT:** This paper describes the smart control of a wind energy system over the internet using an Android device, namely a tablet or a smartphone. With maturity of advanced technologies and urgent requirement for maintaining a healthy environment with reasonable price, Wind energy power plants, also known as wind farms, comprise multiple wind turbines. The main Objective of the application helps to save the time of wind plant owner. And also the owner is useful to get detailed information in a digital manner by this Application, Working as a remote interface to the wind turbine. As we know that wind power is the most economic new power plant technology due to reduce installation cost, no fuel costs, and construction time of less than one year. Our concepts provide to the user to get complete details about the wind turbines, whether it is working or not properly, user will register for this application with basic credential which is necessary to this Application. After registering, admin gives a right to the user to check the daily update, and activities about their wind turbine. In necessary of any urgent situation without visiting to that area, a user can get an updates, so it is very useful to owner to save time and energy. Id any emergency occurrence, then notify through emergency notify button. In this application there is a special keyword called Smart status, this helps to user get particular date transactions and updates Through SMS.

**KEYWORDS:** Wind Turbine, Emergency notifies, SMS, Smart Status.

### I. INTRODUCTION

The wind energy is friendly to the surrounding environment, as no; fossil fuels are burnt to generate electricity from wind energy. Here a wind turbine requires a less space than average power stations. When it is combined with the electricity, this energy source is great for developed and developing countries to provide a steady, reliable, supply of electricity. When wind turbine and blades are installed successfully, it starts working to generate the electricity by air in atmosphere. Here the owner of the wind plant cannot get any updates and data about the plants, means generated energy and saved units on that day. So this application helps to know about that database of daily activities in the plant.

User can register with this application with mandatory information along with requires images and documents, so the user gets a registered ID and password. It is possible to change their password by user account; it gives security of data and information's about the user and wind turbine. After registering successfully admin can give some rights to user side, employee side interactions, employee of that particular turbine can manage the daily activities of the plant. So it is useful to maintain the data in smart way by using this application. Employees of the plant can update daily details of the plant like generating energy and saved energy, sold units of day, the remaining units of the day and daily activities which is required mandatory in this application.

This app is useful to the owner of the plant go get daily updates about the wind turbine and generated energy per day, detailed information's about energy sold and remaining unit in a smarter way without visiting to the plant by registering

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to this app. Major keyword used in this app is 'Emergency notify' means if turbine gets trouble in rotating blades or get any technical problem while working, this button will help to notify the current status and required solutions for that. This feature is very useful to the owner and employees to take necessary actions to repair that problem. Here admin can also monitor the database of that plant and give some suggestions to employees and owner to inform about the status of the plant. Here the current status and information's about the plant can be sent to owner through SMS so it is good moving to get data in a smart way.

User can save their time by using this app and interact with employees in a digital way for better security, if turbine and blades having problem about rotations and any natural disaster occurrence there is an option to employees of the plants to take photos and upload or send to owner to intimate about the problem. In this app finally it is helpful to plant owner to get daily updates about their plants, so the main objective of this paper helps to society for better and secure activities in a smart way. In many times owner cannot go to plants to verify the data, if the owner used this application, it gives smart connections between plant and employee, owner. Finally this app is user friendly and time saving.

## II. EXISTING SYSTEM

Wind energy system having manual conventional activities to maintain database about the daily transactions in the plant, so this problem can take many times and waste of money. Here needed a huge amount of manpower to store information's, so that the existing system gets time consuming and loss of data. Employees can do the work in a completely manual way to maintain the data of turbine and how much energy generated per day, stored energy, and sales data in a day. This system is unsatisfied for the user and employee of the plant, so this makes a problem for getting data of each day. Current employees can take daily reports in the form of maintaining a ledger, so it is possible to lose data easily. Here there are no possibilities to inform the current status of turbine, whether it's working in good condition or not, therefore the employee will always watch and get information's about the errors. In this system owner and employee doesn't know the current status of the generated energy in a smart way so it is also a tremendous issue.

### Problems Faced in Wind plants:

- Huge amount of manpower required to maintain the database.
- Owner cannot get current status of the plant without visiting.
- Database maintenance is manual.
- Loss of data is possible, due to reports are saved in ledger.
- Time consuming.
- No data security, here data security is completely less.

## III. PROPOSED SYSTEM

The proposed system of this paper is more efficient, giving smart activities to the employees and owners for better tasks. Here employee and owner can interact with digitally, so there are no issues occurring while maintaining a database through the app, user and admin have some rights to get possible data in smart ways. Owner of the plant can install this app and register through a basic details of the plant, after registering he will get an ID and transactions rights. This system gives daily updates about the plant which is working or not in the proper way, so it is useful to owner and employees to make their work easy. Here daily reports are auto generated and send to super user of this app through SMS, and also possible to get the complete structure of the turbine status in a few clicks. Employees of the plants can have the rights to update daily generated unit and sale unit in their part in the app, so super ID person can see the daily reports in smart way by using this App. Here emergency, notify button is enabled to employees in the plant to inform the problems to concern authority in a smart way, they can send SMS also to that authority or directly send effected images through this app. So it is easy to repair the plant immediately and make working in good condition without

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wasting of time. The Proposed system is helpful to owner to check the daily transactions and reports of the plant without visiting to that plant by few clicks.

### Features of proposed system:

- Less amount of man power required to maintain the database.
- Owner of the plant get status of the plant without visiting to the plant.
- Database maintenance is completely smart.
- No loss of data.
- Interaction between employee and owner is done in digital way.
- Take less time.
- Data security.

## IV. RELATED WORK

### Wind Energy Basics:

Wind is caused by the uneven heating of the atmosphere by the sun, variations in the earth's surface, and rotation of the earth. Mountains, bodies of water, and vegetation all influence wind flow patterns, Wind turbines convert the energy in wind to electricity by rotating propeller-like blades around a rotor. The rotor turns the drive shaft, which turns an electric generator. Three key factors affect the amount of energy a turbine can harness from the wind: wind speed, air density, and swept area.

In short: wind is a clean source of renewable energy that has lots going for it. It produces no air or water pollution. Operational costs are nearly zero once a turbine is erected. And advances in mass production and technology are making both turbines and batteries cheaper and safer. Many governments are even offering tax incentives to spur wind-energy development on, making it a key player in the future of energy. And the stats back this up too. Over the past decade, wind turbine use has increased by more than 25 percent per year

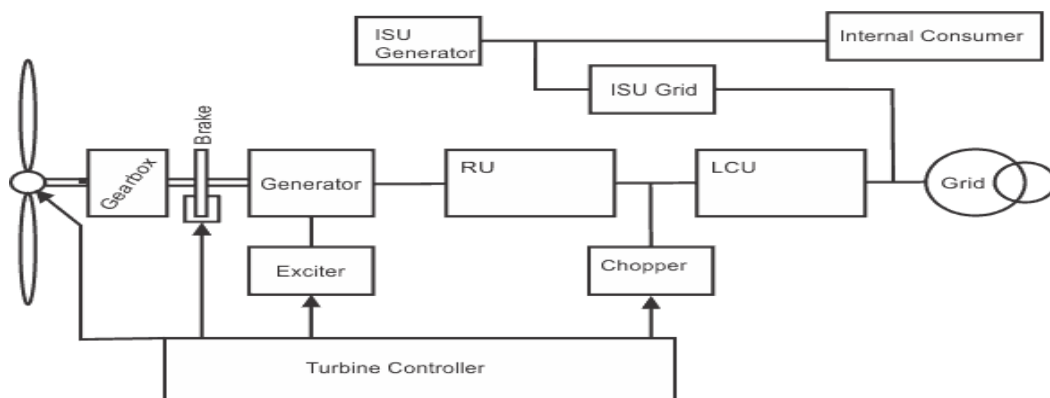


Fig 1: Working Principle of wind turbine

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Fig 2: Working In Good Condition.



Fig 3: Turbine Blades Failure.

## U.S. wind capacity by initial operation year (2010-2020)

gigawatts



Source: Compiled from U.S. Energy Information Administration (EIA)

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## Equation for Wind Power

$$P = \frac{1}{2} \rho A V^3$$

### ❖ Wind speed

The amount of energy in the wind varies with the cube of the wind speed, in other words, if the wind speed doubles, there is eight times more energy in the wind means ( $2^3 = 2 \times 2 \times 2 = 8$ ). Small changes in wind speed have a large impact on the amount of power available in the wind.

### ❖ Density of the air

The more dense the air, the more energy received by the turbine. Air density varies with elevation and temperature. Air is less dense at higher elevations than at sea level, and warm air is less dense than cold air. All else being equal, turbines will produce more power at lower elevations and in locations with cooler average temperatures.

### ❖ Swept area of the turbine

The larger the swept area (the size of the area through which the rotor spins), the more power the turbine can capture from the wind. Since swept area is  $A = \pi r^2$ ,  
Where r = radius of the rotor, a small increase in blade length results in a larger increase in the power available to the turbine.

## V. CONCLUSION

This paper presents a smarter way to get a complete database about the plant and generated units, sale, remaining unit in a digital way without visiting to the plant. This technology can provide a means of accessing data from anywhere, a human machine interface (HMI) for remotely viewing and monitoring the systems. Engineers or employees can monitor data for trends, view historical data over periods of time, instantly receive alarms based on measurements, or remotely control an application or test sequence. The smart control of a wind turbine system over the internet using an Android device presents, generally speaking, security concerns, but it is required in order to access to the turbine workstation. Using these technologies requires the workstation to have a static IP address which may in itself cause security issues. None of the technologies require the Android mobile device to be rooted, which is a serious advantage. The monitoring of wind turbines informs the prevention of accidental situation due to component or structural failure. So this paper concludes that interaction is done in a smart way.

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