Introduction:

This project mainly focuses on generating a electrical energy from Wind Energy. The idea proposed here is a new technique to generate electrical energy From Wind Energy produced due to the vehicle motion in Highways. Using a Turbine mechanism which is easy to implement. Cost effective without disturbing the current Road Design or even disturbing the traffic.

Wind power is extracted from air flow using wind turbines or sails to produce mechanical or electrical power. Windmills are used for their mechanical power, wind pumps for water pumping, and sails to propel ships. Wind energy as an alternative to fossil fuels, is plentiful, renewable, widely distributed, clean, produces no greenhouse gas emissions during operation and uses little land. The effects on the environment are generally less problematic than those from other power sources.

Recently, in order to comply with the policies of energy conservation and use of renewable sources of energy the power is generated by wind energy and other renewable energy sources.

Objectives:

- Designing wind turbines which are different from wind fans.
- Due to the fast motion of vehicle in highways blades connected to the rotor starts rotating in turn the rotor the turbine rotates i.e kinetic energy is converted into mechanical energy. This turbine motion causes the generator (Dynamo) Mechanism to generate Electrical Current (i.e. converting mechanical energy to electrical).
- Monitoring Density of vehicles. If the density is more intensity of lights will be high. If the density is less intensity will be switched to low level.
- Smart solar tracking system

Methodology:

Due to the Vehicle motion the turbines placed beside the road starts rotating. The Mechanical Energy produced in turn causes the dynamo Mechanism to produce electrical
Energy. The Electrical Voltage Produced will be Amplified Using the Amplifiers and this is connected to 12V battery. So that Battery will charge from this Wind Turbine[1].

In this project IR sensors will be placed beside the roads. First IR will be placed at the beginning of the road, When the first IR sensor is sensed which indicates that vehicle has enter the street & its output is given to the controller depending upon which street lights in that road will be switched ON. Second IR will be placed at the end of the road, when is detected which indicates that vehicle is passed out of the street & its output is given to the controller depending upon which street lights will be switched OFF. As well as from IR output the Density of vehicles will be monitored. If the density is more intensity of lights will be high. If the density is less intensity will be switched to low level. To control intensity level we use PWM technique.

LDR will be keep checking the sunlight whenever sunlight is less LDR gives maximum output and street Lights will be turned ON. When it gives minimum output lights will be turned OFF. This smart solar tracking system is intensity based, which rotates to the direction where the intensity of the sun light is more.

8051 architecture based P89V51RD2 microcontroller from NxP is used to implement this project. Microcontroller acts as the heart of the project, which controls the whole system. It contains 1k RAM, 64k Flash, 3 Timers, 2 external interrupts, 1 UART, 32 GPIO’s, ISP programming support etc. KEIL IDE is used to program the microcontroller and the coding will be done using Embedded C.

![Diagram](image_url)

**Figure 5.1: Block diagram of Power Generation using Wind Turbine**
Hardware and software requirements

HARDWARE REQUIREMENTS:
- Microcontroller – ARM LPC 2148-NxP
- IR Sensor
- LED’S
- Street lights
- LDR
- GSM

SOFTWARES REQUIREMENTS
- Embedded C
- Kiel Compiler
- Flash Magic

Results & conclusion:

Result:
The results are taken on the basis that, 100 vehicle travelled at average speed of 70 km/hr at regular average wind speed of 4.5 m/s for the duration of 2hrs. The electric power generated from designed wind turbine is approximately 200 Watt –hr.

Conclusion:
- Can overcome the crisis of natural power production resources in forth coming days
- Can reduce the wastage of electricity.
- Ultimately can conserve some of the natural resources from completely getting vanished.

Scope for Future work:
This Work can be extended to trains and metro trains as the speed is high as compared with on road vehicles.
The stored energy can be utilized for agricultural fields and rural electrification.
As future scope we can make use of Vortex Bladeless a radical new way to generate wind energy.