## **🚗🔋 Project Title: Energy Harvesting from Road Traffic**

### **🎯 Objective**

To design and evaluate systems that capture and convert mechanical energy from vehicular movement into usable electrical energy, contributing to sustainable infrastructure.

### **⚙️ Technologies Explored**

* **Piezoelectric Roadways** Embedding piezoelectric materials beneath road surfaces to generate electricity from pressure exerted by passing vehicles.
* **Kinetic Energy Recovery Systems (KERS)** Mechanical systems using springs and flywheels to capture energy from vehicle motion, especially during braking.
* **Traffic-Powered Wind Turbines** Installing vertical-axis turbines near highways to harness wind generated by fast-moving vehicles.
* **Vehicle-to-Grid (V2G) Technology** Electric vehicles act as mobile energy storage, feeding power back into the grid during idle periods.

### **🧪 Methodology**

1. **Site Selection** Choose a high-traffic area for simulation or prototype deployment.
2. **System Design**
   1. Use piezoelectric sensors or mechanical plates with springs.
   2. Connect to a generator and energy storage unit.
3. **Simulation & Modeling**
   1. Use tools like MATLAB or Simulink to model energy output.
   2. Analyze traffic patterns and load distribution.
4. **Prototype Development**
   1. Build a scaled-down model with embedded sensors or mechanical plates.
   2. Measure voltage/current output under simulated traffic loads.
5. **Data Collection & Analysis**
   1. Record energy harvested over time.
   2. Evaluate efficiency, cost, and scalability.

**Link:**[Emergent | Fullstack App](https://road-energy.preview.emergentagent.com/)