# Piezoelectric Footstep Power Generation System

**1. Introduction**
This project demonstrates the generation of electrical energy using piezoelectric sensors embedded under footsteps. The generated energy is monitored using Arduino and displayed on an LCD.

## 2. Components Used

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|---|---|
| Arduino UNO | Microcontroller |
| Piezoelectric Sensor | Energy generation |
| Bridge Rectifier | AC to DC conversion |
| Capacitor | Energy storage |
| 16x2 LCD | Display voltage and steps |
| LED | Indication |

**3. Working Principle**
When pressure is applied on the piezo sensor, mechanical stress is converted into electrical voltage. This voltage is rectified, stored, measured, and displayed.

**4. Power & Energy Calculation**
Voltage (V) = (ADC × 5) / 1023
Power (P) = $V^2 / R$
Energy (E) = P × t

**5. Applications**
Smart roads, Railway stations, Shopping malls, IoT energy harvesting systems.

**6. Conclusion**
Piezoelectric energy harvesting is a promising renewable technology for low-power applications.