**Objectives**

**Effective Wireless Power Transfer**

To design and implement a system that transfers power wirelessly from a transmitting coil to a receiving coil, using electromagnetic induction principles.

**Real-Time Monitoring**

To use an IR sensor and LCD display to indicate the status of the charging station (ON or OFF) in real-time.

**Automated Billing System**

To integrate a billing mechanism that tracks and increments the cost when the charging station is active, providing a seamless payment process.

**Application in EV Charging:**

To develop a wireless charging solution suitable for electric vehicle (EV) charging stations, enhancing efficiency in electric vehicle charging processes.

**Description**

In this project the Arduino controls the system based on inputs from an IR sensor. When the IR sensor detects white light, it triggers a relay, completing the circuit between a pulse generator and a transmitting coil. This coil generates a magnetic field, which is picked up by a receiving coil aligned with it. The induced current in the receiving coil passes through a 7805 circuit and displayed on a voltmeter. An LCD shows the charging station’s status, and a billing system starts when the station is active. This setup can be used for wireless EV charging.

**Working**

In this project the operation begins with the activation of the battery, which powers the circuit. A 7805-voltage regulator then stabilizes the voltage to a 5V, which powers the Arduino and other electronic components. Upon initialization, the Arduino starts running its code. A pulse generator module is connected to a 12V battery (which is recharged by a solar panel), generates pulses. One end of a copper coil consisting of 125 circular turns is connected to a relay and another end to the pulse generator. Output point of pulse generator is connected to the relay. An IR sensor is present in the system to detect the presence of light when triggered by this light, the sensor activates the relay, completing the circuit between the pulse generator and the transmitting coil. When the circuit is completed, the pulses passing through the coil induces a magnetic field according to Fraday’s law of EMI. The status of the charging station is simultaneously displayed on a 16x2 LCD, showing "Charging Station ON" when the sensor is triggered and "Charging Station OFF" otherwise. Additionally, when the station is on, a billing system is activated, incrementing the total charge.

On the receiving end, another coil with 45 turns is placed on the top of the transmitting coil. As the pulse-induced magnetic field from the transmitting coil passes through the receiving coil, it induces a current. These current powers a 7805-voltage regulator circuit on the receiver side, with the output voltage being displayed on a voltmeter. This setup can effectively be used in electric vehicle (EV) charging stations, offering a wireless method to transfer power for vehicle charging.

**Components required**

Arduino (Microcontroller)

Copper coil 125 turns

Copper coil 45 turns

Pulse generator module

5V regulator (X2)

Battery 12V

12 W Solar panel

Voltmeter

LCD 16X2

IR Sensor

Relay

Connecting wires

**Block diagram**

**A diagram of a computer

Description automatically generated**

**A diagram of a machine

Description automatically generated**

**Circuit diagram**

**A circuit board with wires and wires

Description automatically generated**