IBM NaanMuthalvan – Artificial Inteligence Group 4

College name : SSM Institute Of Engineering
And Technology.

College code : 9221

Team Members :

J.MargrateSneka (922121106045)

S.Nagapriya (922121106056)

M.Pooja (922121106064)

C.M.Priyadharshini (922121106069)

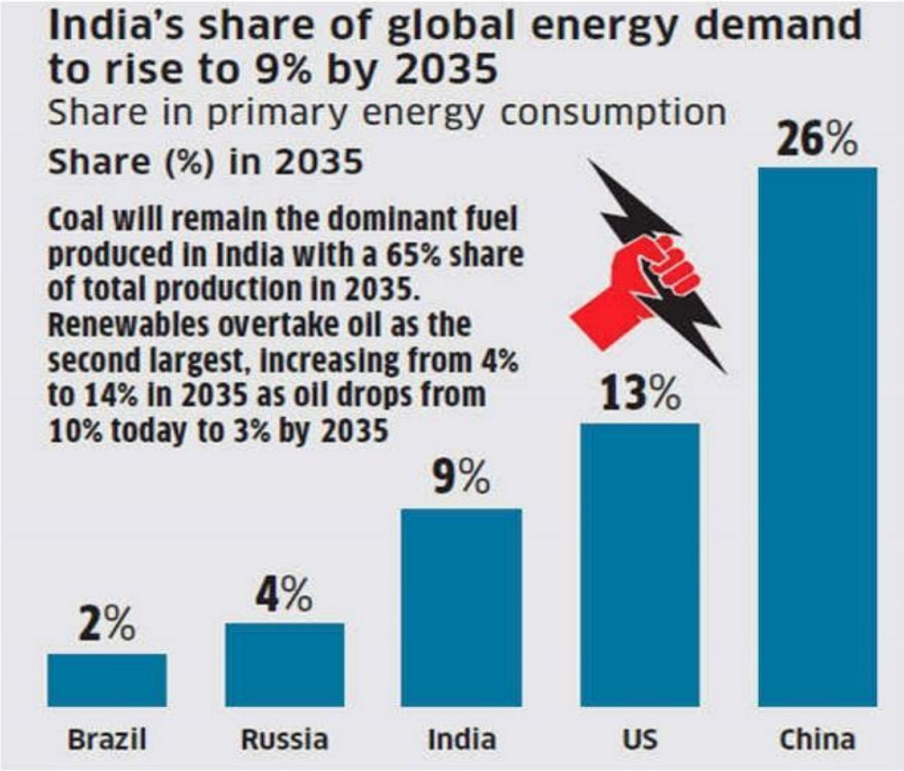
Phase 2:

MEASURE ENERGY CONSUMPTION

MEASURE ENERGY CONSUMPTION:

Measuring energy consumption involves tracking and recording the amount of energy used by devices or systems. It helps understand usage patterns and identify opportunities for energy efficiency and conservation. Tools like smart meters and energy monitoring systems can assist in this process.

To measure energy consumption, you can use tools like smart meters or energy monitoring systems. They help track and record how much energy you're using.



TECHNIQUES TO SOLVE MEASURE ENERGY CONSUMPTION:

To reduce energy consumption, we can try these techniques:

1. **Adjust thermostat settings: Lowering the temperature in winter and raising it in summer can help save energy.**
2. **Use energy-efficient appliances: Look for appliances with ENERGY STAR labels, as they are designed to consume less energy.**
3. **Unplug electronics when not in use: Many devices consume energy even when turned off, so unplugging them can help save energy.**
4. **Switch to LED bulbs: LED bulbs are more energy-efficient and last longer than traditional incandescent bulbs.**
5. **Insulate your home: Proper insulation helps retain heat in winter and cool air in summer, reducing the need for excessive heating or cooling.**
6. **natural lighting: Open curtains and blinds during the day to utilize natural light instead of relying on artificial lighting.**

7. **Optimize water usage: Fix leaks, use water-saving showerheads and faucets, and consider efficient appliances like dishwashers and washing machines.**

ENERGY MONITORING DEVICE:

An energy monitoring device is a device that measures and tracks the energy consumption of various appliances and devices in a home or building. It provides real-time data on energy usage, allowing users to monitor and analyze their energy consumption patterns. This information can help users identify areas where energy is being wasted and make adjustments to reduce energy consumption and save money. Energy monitoring devices can range from simple plug-in meters to more advanced systems that integrate with smart home .

PROBLEM THAT AN ENERGY MONITORING DEVICE CAN HELP TO SOLVE:

1.Lack of awareness: Many people are unaware of how much energy their appliances and devices are consuming. An energy monitoring device provides real-time data and insights, helping users understand their energy usage patterns and make more informed decisions about energy consumption.

2. **Energy waste: Without monitoring, it's challenging to identify energy-wasting appliances or behaviors. An energy monitoring device helps pinpoint areas of high energy consumption, allowing users to take corrective actions such as adjusting thermostat settings, unplugging electronics, or upgrading to energy-efficient appliances.**

PYTHON CODING TO SOLVE ENERGY MONITORING DEVICE

```
def get_energy_data():
    # code to retrieve energy data from the device
    energy_data = 100  # replace with actual code to fetch data

    return energy_data

def analyze_energy_data(energy_data):
    # code to analyze energy data and perform calculations
    # replace with your own analysis code

    # example: calculate average energy consumption
    total_energy = sum(energy_data)
```

```
    average_energy = total_energy / len(energy_data)

    return average_energy

# main program
while true:
    energy_data = get_energy_data()
    average_energy =
analyze_energy_data(energy_data)

    # display the average energy consumption
    print("average energy consumption:",
average_energy)

    # wait for a specific interval (e.g., 1 minute) before
checking again
    time.sleep(60)
```

This code demonstrates how to retrieve energy data from the device, analyze it, and calculate the average energy consumption. You can customize the code to fit your specific energy monitoring device. Let me know if you need any further assistance!

Solution for Energy Monitoring Device:

1. Gather the necessary components:

- Raspberry Pi (any model will work)

- Current sensor (such as an ACS712)

- Jumper wires

- Breadboard (optional, for easier connections)

2. Set up the Raspberry Pi:

- Install the operating system (such as Raspbian) on the Raspberry Pi.

- Connect the Raspberry Pi to a power source and a monitor (if needed).

- Set up a network connection (either via Ethernet or Wi-Fi) to access the Raspberry Pi remotely.

3. Connect the current sensor:

- Identify the output pins of the current sensor (e.g., VCC, GND, and OUT).

- Connect the VCC pin to a 5V pin on the Raspberry Pi.

- Connect the GND pin to a ground (GND) pin on the Raspberry Pi.

- Connect the OUT pin to a GPIO pin on the Raspberry Pi (e.g., GPIO 17).

4. Install the necessary libraries:

- Open the terminal on the Raspberry Pi (or access it remotely).

- Install the RPi.GPIO library by running the following command:

```
Pip install RPi.GPIO
```

5. Write the Python code:

- Create a new Python file (e.g., `energy_monitor.py`) on the Raspberry Pi.

- Copy and paste the Python code provided earlier into the file.

- Save the file.

6. Run the code:

- In the terminal, navigate to the directory where the Python file is located.

- Run the Python code by executing the following command:

```
Python energy_monitor.py
```

```

**7. Monitor the energy consumption:**

**- The code will continuously read the current sensor data and calculate the energy consumption.**

**- You can modify the code to perform additional tasks or store the data as needed.**
```