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# **School of Future Tech**

# 

# **Case Study Report**

# on

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## **Electricity Usage Monitor**

## by

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### **1. Introduction to the Case Study**

Electricity consumption has increased significantly due to the growing use of electrical appliances in homes, offices, and industries. Many users are unaware of how much power individual appliances consume and how this affects their electricity bills.

This case study focuses on designing and implementing an **Electricity Usage Monitor** that tracks electricity usage of multiple appliances, calculates total power consumption, and estimates electricity cost. The system helps users understand their energy usage patterns and encourages efficient electricity consumption.

### **2. Problem Statement / Case Background (Abstract)**

### Background

Manual calculation of electricity consumption is time-consuming and error-prone. Users often receive electricity bills without knowing which appliances consume the most power. A software-based solution can help in monitoring and estimating electricity usage accurately.

### Abstract

This case study presents the design and implementation of an **Electricity Usage Monitor** using C++. The system allows users to enter appliance details such as power rating (in watts) and daily usage hours. It calculates daily energy consumption in kilowatt-hours (kWh) and estimates the electricity cost based on the cost per unit. The project demonstrates practical application of object-oriented programming concepts and basic energy calculation formulas.

### **3. Case Study Design**

The Electricity Usage Monitor is designed as a simple console-based application with the following components:

### System Design

* User inputs appliance details
* System calculates energy consumption
* Total consumption and cost are displayed

### Functional Flow

1. Enter number of appliances
2. Enter appliance name, power rating, and usage hours
3. Enter electricity cost per unit
4. Calculate total energy consumption
5. Display estimated electricity cost

### **4. Methods & Algorithms Technology Applied in the Problem Statement / Case Study**

### Methods Used

* Input validation
* Iterative calculation using loops
* Object-oriented programming (Class and Objects)

### Algorithms Used

* Energy calculation formula:  
  **Energy (kWh) = (Power in Watts × Usage Hours) / 1000**
* Total cost calculation:  
  **Total Cost = Total Energy × Cost per Unit**

### Technology Stack

* Programming Language: **C++**
* Compiler/IDE: **GCC / Code::Blocks / VS Code**
* Platform: **Console-based application**

### **5. Problem Statement / Case Study Implementation Details and Snapshots.**

### Implementation Details

* A class Appliance is used to store appliance details.
* Each appliance calculates its daily energy consumption.
* A vector stores multiple appliance objects.
* Total consumption and cost are calculated and displayed.

### Snapshots to Include

* Program input screen
* Appliance-wise energy consumption output
* Total consumption and estimated cost output

### A screenshot of a computer program AI-generated content may be incorrect.

### **A screenshot of a computer AI-generated content may be incorrect.6. Problem Statement / Case Study Results and Conclusion.**

### Results

* The system successfully calculates electricity usage of each appliance.
* Total daily electricity consumption is computed accurately.
* Estimated electricity cost helps users understand their power usage.

### Conclusion

The Electricity Usage Monitor provides a simple and effective way to track electricity consumption and estimate costs. It demonstrates the practical use of C++ programming concepts such as classes, objects, loops, and vectors. This project can be extended to monthly billing, file storage, or GUI-based applications.

### **7. References**

 C++ Programming Documentation

 Electricity Billing Concepts – Energy Units (kWh)

 College Notes on Object-Oriented Programming