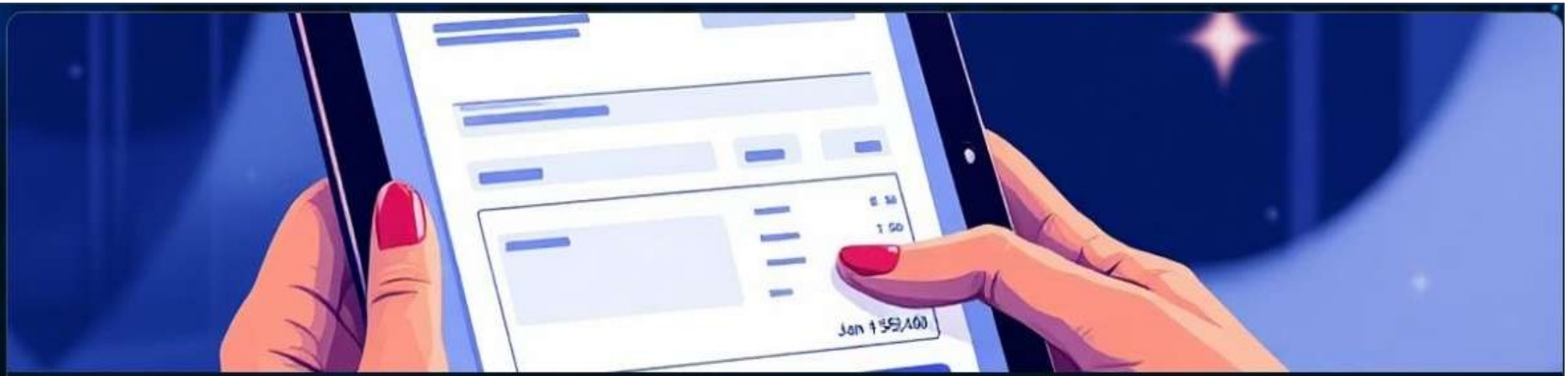
Electricity Billing System

A software-based application designed to modernize electricity billing processes.



Project Goals & Benefits

Computerized Billing

Automates unit consumption calculation and charges.

Enhanced Accessibility

Makes billing easy, accessible, comfortable, and effective for consumers.

High Performance

Offers speed, accuracy, and efficiency in operations.

Resource Saving

Eliminates paper bills and manual tracking, saving human effort.

Core Objectives

→ Track Energy Consumption

Monitor current and previous month's unit usage.

→ Customer Information

Maintain detailed customer records.

→ Automated Billing

Calculate units, generate bills with penalties and rent.

→ Online Payment

Facilitate online payment to save time.

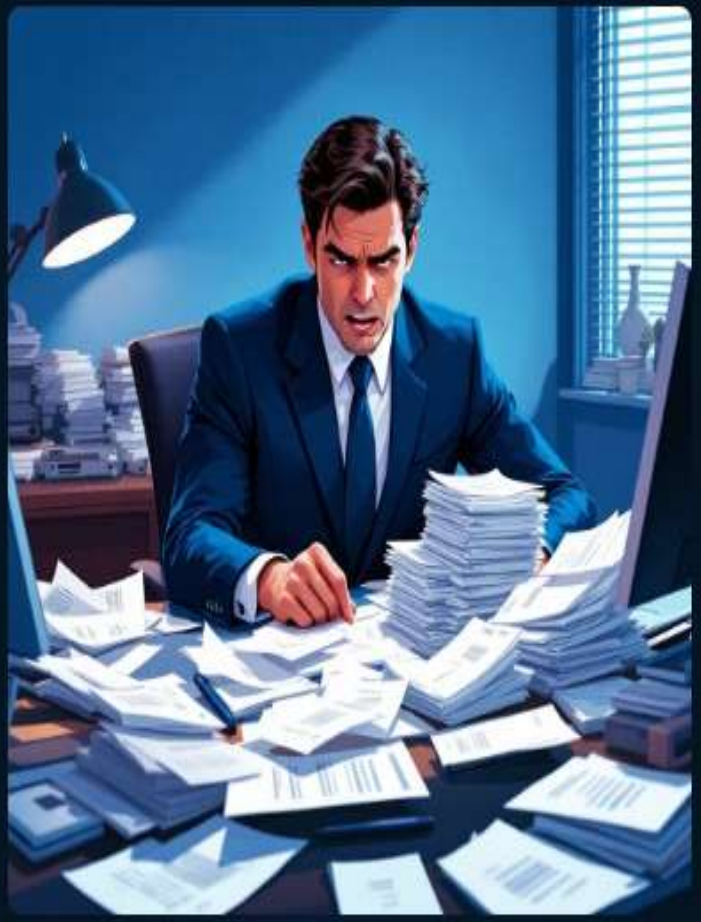
→ Customer Empowerment

Allow customers to view and update their details.

Problem Statement: Manual System Drawbacks

The existing manual electricity billing system is inefficient and prone to errors. It involves tedious processes like staff visiting homes for meter readings and payments, leading to significant time consumption and labor.

The current partially automated system still requires redundant data entry, making it laborious. This project addresses these issues by providing a fully computerized, web-based solution.



Proposed System: Overcoming Challenges

Increased Speed

Faster processing and bill generation.

Enhanced Security

Reduced chances of miscalculation and corruption.

Reduced Staffing

Minimizes the need for manual labor.

Cost-Effective

Economical for both consumers and the company.

Login

Meter No	Username	Password	User	Question	Answer

Customer

Name	Meter No	Address	City	State	Email	Phone

Rent

Cost Per Unit	Meter Rent	Service Rent

Tax

Service Tax	Swacch bharat cess	GST

Bill

Meter No	Month	Units	Total Bill	Status

Meter Info

Meter No	Meter Location	Meter Type	Phase Code	Bill Type	Days

System Design: Database Schema

The database schema defines connections and constraints, ensuring data integrity and efficient performance. Key tables include login, customer, tax, rent, bill, and meter_info, interconnected by primary and foreign keys.

This structure prevents data redundancy and anomalies, crucial for a robust billing system.

Database Normalization

1

First Normal Form (1NF)

Ensures unique rows, single values per cell, and non-divisible data.

2

Second Normal Form (2NF)

Requires 1NF and full functional dependency of non-prime attributes on the candidate key.

3

Third Normal Form (3NF)

Requires 1NF and 2NF, with no transitive dependencies; all fields determinable only by the primary key.

Object-Oriented Programming (OOP) Concepts

Class & Object

Blueprints and instances for entities like Customer, Bill, and Admin.

Encapsulation

Data and methods bundled, restricting direct access for security.

Abstraction

Hides complex internal logic, showing only essential features.

Inheritance

Reuses common functionalities, reducing code duplication.

Polymorphism

Allows methods to perform different actions based on context.

Association

Represents relationships between classes, e.g., Customer to Bill.

System Implementation & Operations

Admin Functions

- Add/Delete/Update Customers
- Search Deposit Details
- Add Tax Details
- Calculate Bills

Customer Functions

- Update Personal Info
- View Bill Details
- Pay Bills Online
- Generate Bills

Future Scope & Limitations

Extensibility

Designed for future enhancements and updates.

Reusability

Code can be reused for new projects, reducing costs.

Understandability

Clear, coherent code for easy maintenance.

Cost-Effectiveness

Developed within budget and time constraints.

Limitations include no remote access, requiring knowledgeable users, and lacking journal features.