

TechVolt

I. Introduction

The Energy Consumption Tracker is a project aimed at addressing the pressing need for affordable and clean energy, aligning with the goals of Sustainable Development Goal 7: Affordable and Clean Energy . This application serves as a comprehensive tool to track and manage energy consumption, empowering users to make informed decisions about their energy usage and contribute to a sustainable future.

The primary goal of the Energy Consumption Tracker is to provide users with a user-friendly platform to monitor their energy consumption patterns, set goals, and receive recommendations on reducing energy usage. By facilitating data input, visualization, analysis, and reporting, the application aims to raise awareness and encourage energy-saving practices among individuals and communities.

A. Objectives

1. User Registration and Login: Develop a secure user registration and login system to ensure privacy and authentication for accessing the application.
2. Energy Consumption Data Input: Implement an intuitive user interface that allows users to input their energy consumption data periodically, enabling them to track their usage accurately.
3. Data Visualization and Analysis: Utilize charting libraries such as JFreeChart or Chart.js to generate visual representations of energy consumption data, enabling users to easily interpret and analyze their usage patterns.
4. Goal Setting and Tracking: Provide users with the ability to set energy consumption goals based on their desired targets or recommended guidelines. Enable tracking of their progress and provide notifications to encourage goal attainment.

5. Energy Saving Tips: Incorporate a dedicated section within the application that offers energy-saving tips and best practices, educating users on effective strategies to reduce their energy consumption.
6. Comparative Analysis: Enable users to compare their energy consumption with aggregated data from other users, fostering a sense of competition and motivating them to further reduce their energy usage.
7. Reporting and Recommendations: Generate comprehensive consumption reports for users, highlighting their energy usage trends and offering personalized recommendations on how to optimize energy efficiency.
8. Integration with Smart Meters: Explore the possibility of integrating the application with smart meters or IoT devices to capture real-time energy consumption data, eliminating the need for manual input and enhancing data accuracy.

B. Features

1. User registration and login system with appropriate security measures.
2. A user-friendly interface for inputting energy consumption data periodically.
3. Utilization of charting libraries for generating graphical representations of energy consumption data.
4. Goal setting and tracking system with notifications and progress monitoring.
5. Dedicated section with energy-saving tips and best practices.
6. Comparative analysis functionality to compare users' energy consumption with aggregated data.
7. Generation of consumption reports and personalized recommendations.
8. Investigation and potential integration with smart meters or IoT devices for real-time data capture and synchronization.

II. Methodology

To accomplish this project, we will adopt the Agile methodology, which emphasizes continuous feedback and iteration. Agile ensures adaptability to changes and fosters

communication between team members, contributing to effective project management. The Java pillars of encapsulation, inheritance, and polymorphism will be essential in structuring our codebase and maintaining readability, scalability, and performance.

We will break down the project into the following phases:

1. Requirements Gathering and Analysis: Understand the core functionalities and user requirements. Conduct market research to identify potential enhancements and unique selling points.
2. Design: Define the architecture and design of the system, including database schemas, interface designs, and system workflows.
3. Development: Code the functionalities, emphasizing readability, efficiency, and modularity. Implement regular code reviews to ensure code quality.
4. Testing: Test each feature rigorously to ensure correctness, robustness, and usability. Use unit testing, integration testing, and system testing.

Deployment: Deploy the system for public use and continuously monitor its performance.

III. Project Description

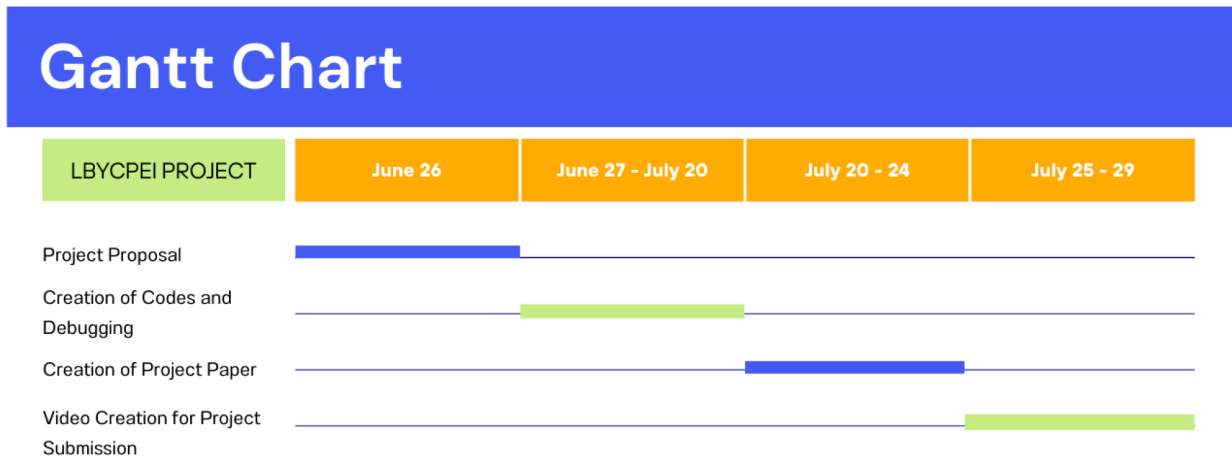
The Energy Consumption Tracker will consist of a three-tier architecture: the client, the server, and the database. The client tier comprises the user interface and input mechanisms, while the server processes user requests and communicates with the database.

The client tier utilizes JavaFX for the user interface, giving a responsive and user-friendly experience. The server tier will be built using Java EE, handling requests such as user login, energy data input, and data visualization. It will also contain the logic for goal tracking and recommendations. Finally, the database tier will be managed using MySQL, storing user details, energy consumption data, and user goals.

Key classes in our UML diagram include User, EnergyData, Goal, and SmartMeter. The User class has methods for account creation and login. EnergyData class contains the

user's energy consumption data and methods for data input and retrieval. The Goal class allows for setting, tracking, and notifying of goals. The SmartMeter class, if applicable, contains methods for retrieving real-time energy data.

IV. Deliverables



Tasks	Point Person
Project Proposal	Everyone
Creation of Codes	Everyone
Debugging and Finalizing of Codes	Everyone
Creation of Project Paper	Everyone
Creation of Project Video Script and Presentation	Enriquez & Polido
Video Editing	Ramos

The application will include a user manual that will instruct users on how to maximize the tool's potential. It will cover the client, server, and database components of the program's three-tier architecture. The user manual will provide guidance on navigating the user interface, entering energy usage data, setting goals, and accessing data

visualization tools. Additionally, it will assist in training new users and resolving common issues. By highlighting advanced features and best practices, the user manual will help users make the most of the application and achieve their energy-saving goals. Overall, it will ensure a consistent and standardized user experience while streamlining energy use tracking and promoting cost reductions.

V. Evaluation

The project's success will be evaluated based on functionality, usability, efficiency, and scalability. We will conduct user testing to assess the system's usability and intuitiveness. Energy data accuracy and the relevance of recommendations will measure efficiency, while scalability will be evaluated by testing the system under high user loads.

VI. Conclusion

The Energy Consumption Tracker project holds significant importance in addressing the need for affordable and clean energy, aligning with Sustainable Development Goal 7. By providing users with a comprehensive platform to monitor, analyze, and optimize their energy consumption, the project aims to foster a more sustainable and environmentally conscious society. The project's key functionalities, such as user registration and login, energy consumption data input, data visualization and analysis, goal setting and tracking, energy-saving tips, comparative analysis, reporting and recommendations, and integration with smart meters or IoT devices, collectively contribute to fulfilling this need. By empowering individuals to track their energy consumption patterns, set goals, and receive personalized recommendations, the Energy Consumption Tracker promotes awareness, behavioral changes, and energy-saving practices. Users can make informed decisions, reduce wastage, and contribute to a cleaner and greener future. Moreover, the project's potential integration with smart meters or IoT devices allows for real-time data capture and eliminates the need for manual input, enhancing convenience and accuracy. This integration further positions the Energy Consumption Tracker as a forward-thinking solution leveraging emerging technologies for efficient energy management. In conclusion, the Energy Consumption Tracker project

offers a comprehensive, user-friendly, and technologically advanced solution to address the need for affordable and clean energy. By empowering individuals with knowledge, insights, and tools to optimize their energy consumption, the project encourages a sustainable lifestyle while contributing to the larger global efforts towards a greener and more environmentally conscious world.

VII. References

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Team Dionysus'

Proposal Members: Enriquez, Polido, Ramos

Section: EQ5

Project Title: Current

Theme: Goal 7: Affordable and Clean Energy

Description:

The most important details of an Energy Consumption Tracker are the user registration and login system, energy consumption data input, data visualization and analysis, goal setting and tracking, energy saving tips, comparative analysis, reporting and recommendations, and integration with smart meters or IoT devices. The user registration and login system allows users to create accounts and securely access the application. The energy consumption data input allows users to enter their data periodically, such as monthly or weekly. Data Visualization and Analysis uses charting libraries like JFreeChart or Chart.js to generate visual representations of energy consumption data. Goal Setting and Tracking allows users to set energy consumption goals based on their desired targets or recommended guidelines.

Energy Saving Tips includes a section with energy-saving tips and best practices to educate users about ways to reduce their energy consumption. Comparative Analysis allows users to compare a user's energy consumption with aggregated data from other users. Reporting and Recommendations provides recommendations on how to further reduce energy usage. Integration with Smart Meters provides real-time data and eliminates the need for manual input.

Additional Features:

1. User Registration and Login: Allow users to create accounts and securely access the application.
2. Energy Consumption Data Input: Provide a user interface for users to input their energy consumption data periodically.
3. Data Visualization and Analysis: Generate visual representations of energy consumption data through graphs and charts.
4. Goal Setting and Tracking: Allow users to set energy consumption goals, track their progress, and receive notifications.
5. Energy Saving Tips: Include a section with energy-saving tips and best practices.
6. Comparative Analysis: Enable users to compare their energy consumption with aggregated data from other users.
7. Reporting and Recommendations: Generate consumption reports and provide personalized recommendations for energy reduction.
8. Integration with Smart Meters: Explore integration with smart meters or IoT devices for real-time data capture and sync.

