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# **Software Requirements Specification**

**for**

**CARBON FOOTPRINT**

**Version 1.0**

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**Date create:-**

**19/05/2023**

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# **1. Introduction**

## **1.1. PURPOSE**

This document describes the software requirements and specifications of Carbon Footprint Application. It is an online application that can help individuals or organizations estimate their carbon footprint, which is the total amount of greenhouse gases, particularly carbon dioxide (CO<sub>2</sub>), emitted directly or indirectly through their daily activities or operations.

The key objectives are:-

Awareness and Education, Measurement and Tracking, Behavior Change, Goal Setting and Progress Monitoring and Comparison and Benchmarking.

## **1.2. DOCUMENT CONVENTIONS**

Text formats:

Font : - Times New Roman (Body), Constantia (Headings)

Font size: - 11 for Body, 16 for Sub-Headings and 22 for Headings.

Document conventions:

<b>MNEMONICS</b>	<b>MEANING</b>
<b>DB</b>	Database
<b>DDB</b>	Distributed Database
<b>DFD</b>	Data Flow Diagram
<b>ER</b>	Entity Relationship
<b>SS</b>	Screenshot

## **1.3. INTENDED AUDIENCE AND READING SUGGESTIONS**

This App is not intended towards any particular crowd or audience, rather it focuses on all types of people. However, generally speaking, the following groups of people or organizations can benefit from app:-

1. Individuals who are interested in understanding and reducing their personal carbon footprint and are motivated by saving money through energy efficiency or who concerned about the environmental impact of their lifestyle choices.

2. Businesses and Organizations can use for businesses that aim to demonstrate their commitment

to sustainability, engage in corporate social responsibility, or meet carbon reduction targets.

3.Educational Institutions can offer related courses to help learners understand the concepts of carbon emissions and sustainable living.

4.Event Planners can measure emissions from transportation, energy consumption, waste management.

5.Governments and NGOs can utilize to create awareness, and encourage citizens to reduce their carbon emissions.

## **1.4. PROJECT SCOPE**

The scope of a carbon footprint calculator app depends on its specific features, goals, and target audience, they are:-

1. Emission Sources: The app should cover a wide range of emission sources like energy consumption, transportation, diet, waste generation etc. to provide a comprehensive carbon footprint assessment.
2. Data Input and Calculation: The app should allow users to input relevant data about their activities, such as energy usage, travel distances, fuel consumption, or waste generation
3. Tracking and Monitoring: It provides historical data, visualizations, and trends to help users understand their progress and identify areas where emissions can be reduced.
4. Recommendations and Tips: These recommendations can include energy-saving techniques, sustainable transportation alternatives, eco-friendly products, waste reduction strategies, or dietary changes.

## **1.5. REFERENCES**

<https://www.carbonfootprint.com/>  
<https://www.footprintnetwork.org/>  
<https://www.cleanenergyregulator.gov.au/>  
<https://www.carbontrust.com/>  
<https://developer.android.com/>  
<https://github.com/>

## **2. Overall Description**

### **2.1. PRODUCT PERSPECTIVE**

It encompasses various aspects such as project goals, stakeholders, requirements, timeline, resources, and risks. Here are some key considerations for the project perspective of a carbon footprint calculator app:-

1. Project Goal is to raise awareness, encourage behavior change, providing accurate carbon footprint calculation, or promote sustainable practices.
2. Stakeholder Analysis- needs, expectations, and how the app will benefit them.
3. User Experience (UX) Design: Create intuitive and user-friendly interfaces, making it easy for users to input data, view results, set goals, and access educational content.
4. Development Process: Plan the development process, including iterations, milestones, and deliverables by adopting an agile development approach.
5. Testing and Quality Assurance- creating scenarios to identify and fix any bugs or usability issues.

### **2.2. PRODUCT FUNCTION**

A carbon footprint calculator app is intended to assist individuals and organizations in estimating and tracking their greenhouse gas emissions from everyday activities, lifestyle choices, and business operations. Here are some common features of a carbon footprint calculator app:

#### **2.2.1 Data Collection:**

The program allows users to enter information on their carbon footprint, such as energy use, transportation methods, trash generation, and food intake. It might offer a user-friendly interface for inputting and updating this data.

#### **2.2.2 Calculation Algorithms:**

The software processes the collected data and calculates the carbon footprint associated with the user's actions using specified algorithms and emission factors. The input data is converted into equivalent carbon dioxide (CO<sub>2</sub>) emissions or carbon dioxide equivalents (CO<sub>2</sub>e) via these methods.

### **2.2.3 Emission Categories**

The software often covers a wide range of emission categories, such as energy consumption, transportation, food, garbage, and so on. It might include different sections or modules for each category, allowing users to submit data particular to that area.

### **2.2.4 Reporting**

Once the carbon footprint is calculated, the app generates detailed reports or summaries presenting the user's emissions in each category. It may display the results in graphs, charts, or numerical values, giving users a clear overview of their environmental impact.

### **2.2.5 Comparison and Benchmarks**

Some carbon footprint calculator apps allow users to compare their emissions with benchmarks or averages, such as regional or industry averages. This feature can help individuals or organizations assess their performance and identify areas for improvement.

### **2.2.6 Tips and Suggestions:**



The app may offer personalized recommendations and tips on how to lower one's carbon impact. Based on the user's individual emissions profile, it may provide practical advice, eco-friendly alternatives, and energy-saving measures.

### **2.2.7 Goal Setting and Tracking:**

Within the app, users may establish carbon reduction objectives and track their progress over time. To keep users inspired and interested in their sustainability efforts, the app may offer progress charts, milestones, or notifications.

### **2.2.8 Education and Awareness:**

Some applications provide instructional material to help people understand climate change, sustainability, and the environmental effect of certain activities. Articles, infographics, films, and quizzes may all be used to improve user comprehension and encourage sustainable behavior.

### **2.2.9 Data Privacy and Security**

The privacy and security of user data should be prioritized in a carbon footprint calculator app. It must clearly describe how it manages and protects user information and adhere to any data protection legislation.

### **2.2.10 Integration and Connectivity:**

Integration with other tools or platforms, such as smart home gadgets, transit applications, or e-commerce platforms, may be available through the app. This facilitates data transmission and improves the accuracy of emissions computations.

### **2.2.11 Multi-platform Accessibility**

The app may be offered on numerous platforms, including smartphones (iOS and Android), tablets, and web browsers, in order to reach a larger audience. This guarantees that users may easily access and utilize the software across several devices.

## **2.3. USER CLASSES AND CHARACTERISTICS**

User classes refer to the different types of users who would typically interact with a carbon footprint calculator app. Here are some common user classes and their characteristics:

### **1. Individual Users:**

These are people who use the app to calculate and track their carbon footprints. They might be environmentally concerned people, climate activists, or those who want to understand and limit their environmental influence. Characteristics that may be present include:

- a. They are concerned about their carbon footprint and environmental effect.
- b. Motivated to embrace environmentally friendly practices and lower their carbon impact.

- c. Would you want to get personalized suggestions and ideas for living a more sustainable lifestyle?
- d. Willing to track their progress and establish carbon-cutting targets.

## 2. Corporate/Organizational Users:

These users are firms, corporations, or organizations that want to measure and manage their carbon footprints.

- a. Corporate sustainability managers or environmental officers in charge of measuring and reporting emissions are examples of characteristics.
- b. Interest in discovering carbon-reduction opportunities and applying sustainable practices in their business.
- c. To satisfy legal obligations or demonstrate corporate social responsibility, thorough reports and data are required.
- d. Multi-user access, data exchange between teams, and interaction with current sustainability management systems may be required.

## 3. Educational Institutions:

Schools and universities, for example, may use the app to teach students and increase awareness about carbon footprints. Characteristics that may be present include:

- a. Teachers or educators interested in incorporating environmental education into their curriculum.
- b. Students of all ages who are interested in learning about climate change and sustainability.
- c. To effectively engage pupils, instructional information, interactive features, and gamified aspects are required.

4. Environmental organizations: They may use the app to engage their members, increase awareness, and encourage sustainable behaviors. Characteristics that may be present include:

- a. Environmentalists who are members or supporters of environmental organizations.
- b. Individuals who want to remain up to date on environmental concerns and their personal effect.
- c. Want to learn more about local or worldwide environmental activities and campaigns.
- d. For a greater impact, integration with existing environmental platforms or databases may be pursued.

5. Policymakers and academics: The app may be used by policymakers, academics, or environmental consultants to collect data and insights on carbon footprints for policy development, analysis, or academic purposes. Characteristics that may be present include:

- a. Professionals engaged in environmental research or policy formulation.
- b. Carbon emissions data must be precise and thorough.
- c. Analyzing trends, patterns, and geographical differences in carbon footprints is of interest.

## **2.4. OPERATING ENVIRONMENT**

A carbon footprint calculator app's operational environment refers to the technological and environmental parameters required for the app to work properly. The following are the major components of a carbon footprint calculator app's operational environment:

- a. Platforms for mobile and online: The app should be developed to work on certain mobile platforms (such as iOS or Android) and web browsers.
- b. Internet Access: For data synchronization, updates, and access to online resources, the app may require an active internet connection
- c. Data Storage and Servers: To securely store user data, run computations, and create reports, the app may rely on servers or cloud-based storage systems
- d. If the app has transportation or trip emissions capabilities, it may use GPS and location services to monitor and compute distance travelled, route optimization, and emissions associated with specific sites.
- e. APIs & Integrations: To improve functionality, the app may interface with other platforms, tools, or databases.
- f. Security and Authentication: The operating environment should incorporate suitable safeguards such as secure data transfer, encryption, and user authentication protocols to protect user data and assure app security.
- g. Energy Efficiency: Given the app's objective of calculating carbon footprints, it should strive for energy efficiency.
- h. Scalability and performance: The app should be designed to manage a wide range of user loads and data volumes while maintaining smooth performance and responsiveness even during high usage periods.
- i. Accessibility: The app should be used by people of all abilities. It should follow accessibility criteria, including screen reader compatibility, customizable font sizes, and other accessible features.
- j. Compliance with appropriate legislation and guidelines, such as data privacy laws (e.g., GDPR) and sustainability reporting requirements (e.g., GHG Protocol), should be ensured in the operational environment.

## **2.5. DESIGN AND IMPLEMENTATION CONSTRAINTS**

- a. Data Availability and Accuracy: The accuracy and availability of data on carbon emissions varies by area and industry. The app's usefulness is dependent on the availability of current

and trustworthy data sources

b. Data Privacy and Security: To safeguard user information from unauthorized access or data breaches, we must prioritize data privacy and apply proper security measures.

c. Technological Restrictions: The design and functionality of the app is limited by processor power, storage capacity, and network connectivity.

## **2.6 USER DOCUMENTATION**

For user manuals and help use help option in the main menu.

## **2.7 Assumption and Dependencies**

Carbon Footprint Application can help in lessening of carbon emission in atmosphere and educate people for the same.

## **3. External Interface Requirements**

### **3.1. USER INTERFACES**

The Carbon Footprint App user interface should be intuitive, such that 99.9% of all new users are able to use the app without any assistance.

### **3.2. HARDWARE INTERFACES**

The hardware should have following specifications:

- Ability to read gallery
- GPS should be enabled
- Touch screen for convenience
- Camera permission to read barcodes
- Microphone to enable voice typing
- Internet connectivity

### **3.3. SOFTWARE INTERFACES**

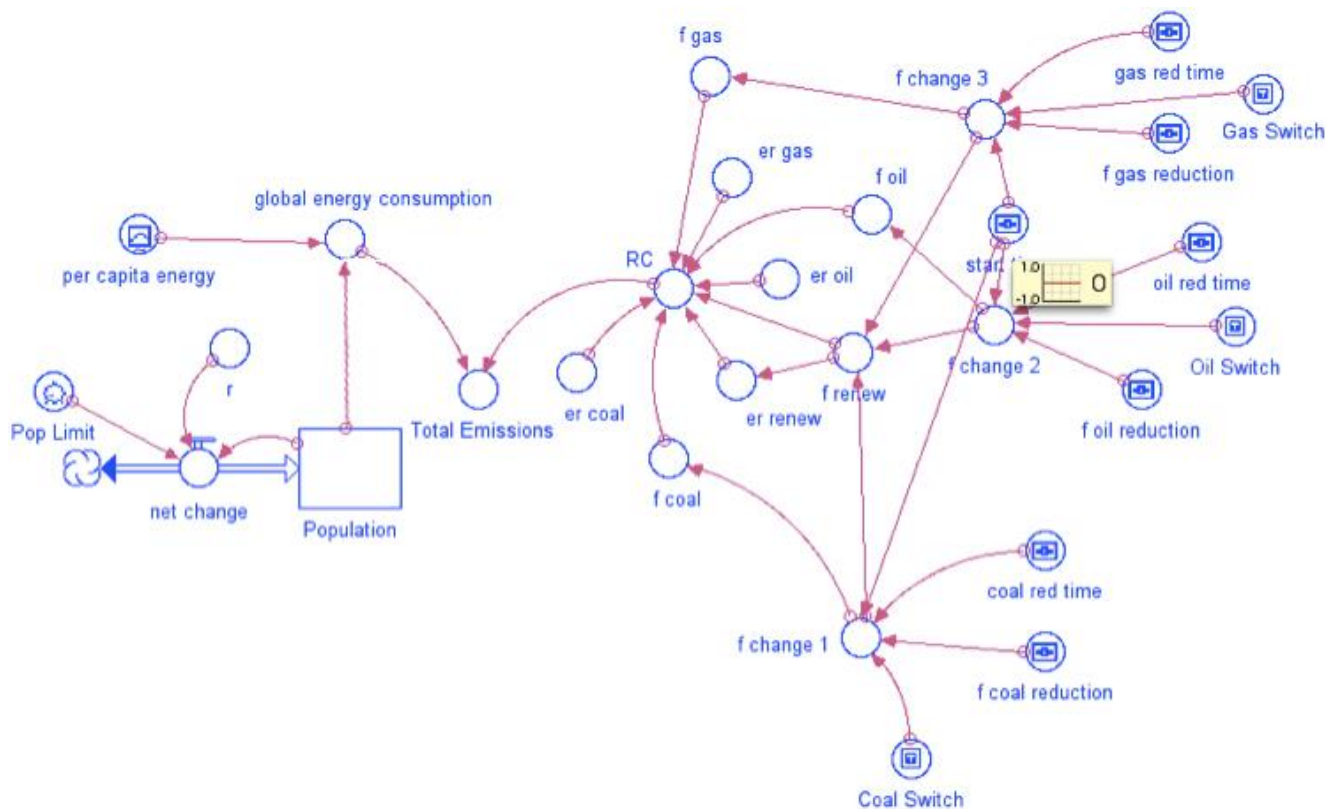
The Carbon Footprint App demands software like GPS, camera, etc... on the following mobile OS (environment):

1. iOS
2. Android

## 4. DESIGN

### 4.1. ENTITY RELATIONSHIP DIAGRAM

An entity–relationship model describes interrelated things of interest in a specific domain of knowledge. A basic ER model is composed of entity types and specifies relationships that can exist between entities.



## **5. Other Non Functional Requirements**

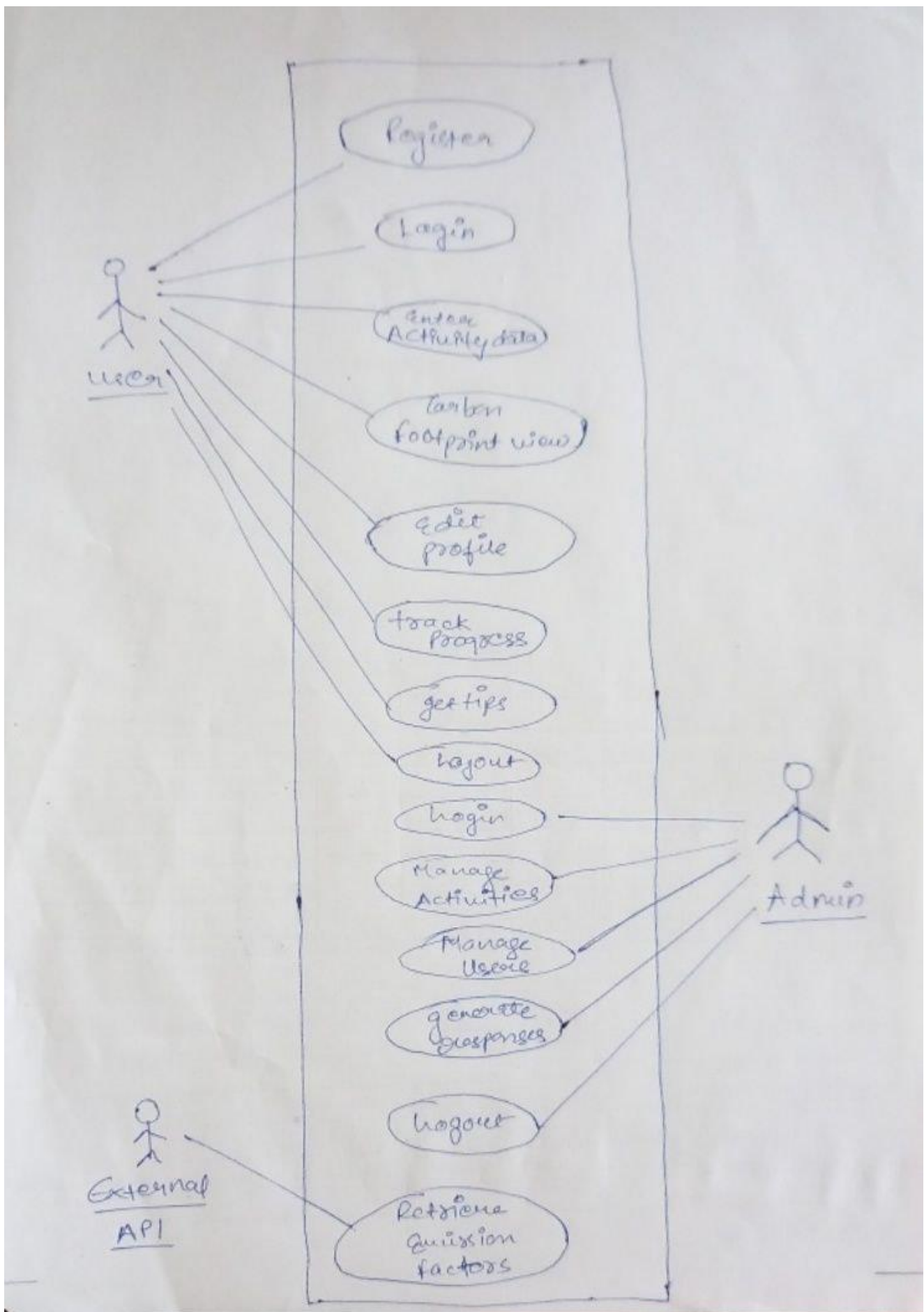
- 5.1. Performance: The app should be responsive and provide quick calculations and results. It should efficiently handle calculations, data processing, and user interactions without significant delays or lags.
- 5.2. Usability: The app should have an intuitive and user-friendly interface, making it easy for users to navigate, enter data, and view their carbon footprint results. Clear instructions and informative feedback should be provided to guide users through the process.
- 5.3. Reliability: The app should be reliable and accurate in calculating carbon footprints. It should consistently produce correct results based on the user's inputs and the most up-to-date emission factors and data sources.
- 5.4. Security: User data, including personal information and activity details, should be securely stored and transmitted. The app should employ appropriate security measures, such as encryption and secure authentication, to protect user privacy and prevent unauthorized access.
- 5.5. Scalability: The app should be designed to handle a potentially large user base and increasing data load. It should be scalable to accommodate growing usage, ensuring that performance remains stable even during peak periods.
- 5.6. Compatibility: The app should be compatible with a range of devices, operating systems, and screen sizes to reach a wider user base. It should be designed responsively or have adaptive layouts to provide a consistent user experience across different devices.
- 5.7. Accessibility: The app should be accessible to users with disabilities, conforming to accessibility standards and guidelines. It should support features such as text-to-speech, high contrast mode, and alternative input methods to ensure inclusivity.
- 5.8. Maintainability: The app should be developed using clean, modular, and well-documented code to facilitate future updates, bug fixes, and enhancements. It should be easy to maintain and extend with new features or integration of new data sources.
- 5.9. Performance Efficiency: The app should optimize resource usage, such as battery life and network data consumption, to ensure efficient operation on mobile devices. It should minimize unnecessary background processing or excessive data transfers.
- 5.10. Offline Capability: While internet connectivity is typically assumed for accessing up-to-date data, the app may provide limited offline functionality. For instance, it could allow users to enter data and perform basic calculations while offline, with the option to sync data once a connection is established.

## **6.Other Requirement**

*Appendix B: Analysis Models*

**Use case diagram:-**





**Appendix C: To Be Determined List**

1. Social Sharing
2. Gamification
3. Real-time Tracking
4. Carbon Offsetting
5. Comparison and Benchmarking
5. Personalized Recommendations
6. Integration with Smart Devices
7. Green Alternatives
8. Carbon Footprint History
9. Educational Resources