1️⃣ Project Overview

EcoSphere X is a **web-based sustainability platform** that tracks, analyzes, and reduces an individual's carbon footprint through their daily lifestyle actions. Using barcodes, bills, travel logs, energy usage, and waste management inputs, the platform calculates carbon impact and rewards users for making sustainable choices.

2️⃣ Problem Statement

Most people want to live sustainably, but good intentions don't become habits because they feel lost. There's no daily accountability, impact is hard to measure, existing tools are confusing, and eco-friendly actions rarely get rewarded. Awareness alone doesn't create behavior change — people need support. What's missing is a simple, human system that tracks their footprint automatically, offers clear insights and improvement paths, and rewards every sustainable action to turn motivation into real impact.

3️⃣ Solution Overview

EcoSphere X is a **Carbon Accountability System**.

It measures footprint across:

Impact Area	Tracking Feature
Shopping	EcoScan + EcoCart Timeline
Transportation	EcoMiles
Home Energy	EcoWatt Insights
Food (Parcel/Packaged)	EcoPlate
Waste Disposal	EcoCycle Log

🧠 **All activities → Carbon Wallet → EcoScore → Rewards**

4️⃣ Vision & Mission

🎯 Vision

To make sustainability a **daily habit** by enabling carbon accountability for every action.

🚀 Mission

To help individuals reduce their footprint by giving them:

- Awareness
- Measurement
- Rewards
- Community

5️⃣ Target Audience

- Students & College campuses
- Households & Working professionals
- Cafes / Restaurants (EcoPlate certification)
- Businesses switching to ESG reporting
- NGOs, CSR bodies, and green brands

6️⃣ System Architecture

User → EcoScan/Core Input
    → Database → Carbon Engine
    → Carbon Wallet
    → Dashboard + Rewards

Internal Modules:

- Input Layer: Scan/Upload/Manual Input
- Processing Layer: Carbon Calculation Engine
- Confidence Layer: Verification & proof system
- Output Layer: Scores, Insights, Rewards

Feature Documentation

Core Features (List)

#	Module	Feature Name
☐1	Shopping Scanner	EcoScan
☐2	Travel Tracking	EcoMiles
☐3	Home Energy	EcoWatt Insights
☐4	Food Parcel Tracking	EcoPlate
☐5	Purchase Impact Tracker	EcoCart Timeline
☐6	Waste Disposal	EcoCycle Log
☐7	Rewards & Leaderboards	EcoPoints & EcoScore
☐8	Community & Events	EcoCircle

EcoScan (Core Feature)

📌 **Purpose:** Identify carbon impact at the point of purchase

How it Works

- Scan **barcode / QR**
- Upload **bill/receipt**
- Detect:
  - Packaging material
  - Imported/local product
  - Brand sustainability index
- Suggest greener alternatives
- From the product type , predict an expiry date based on shelf life
- Add Item to the Active Inventory

Purpose: Understand purchase patterns, packaging impact & expiry risks early

Outputs

- Carbon Rating: 🟢 Low / 🟡 Medium / 🔴 High
- Instant carbon value (CO_2e)
- Adds entry to EcoCart Timeline

Transportation Tracker

🚊 EcoMiles

How it Works

- Daily commute log
- Default smart routes
- Google Maps integration (optional)
- Vehicle selection:
  - 🚲 Bike, 🚌 Bus/Metro, 🚗 Petrol, ⚡ EV
- Reliability check: **Ticket/Odometer photo**

Outputs

"Your travel footprint decreased by 14% this week"

EcoScan Connection

- Scanning EV/cycle items → improves score
- Shows **relationship between purchases & behavior**

Home Energy Tracker

⚡ EcoWatt Insights

Setup
User enters:

- Appliance list
- Wattage
- Star Rating
- Usage hours

Verification
🧾 Upload electricity bill for cross-check

Outputs

- "AC = 52% of home energy carbon"
- LED/Solar suggestions

Packaged/Parcel Food Tracker

🍱🚚 EcoPlate

How It Works

- Scan/upload parcel bill
- Detect:
    - Meal Type
    - Packaging
    - Delivery mode
    - Distance

Output

"Plastic + 8km Delivery $\rightarrow$ 6.4 kg CO_2e (High Impact)"

Improvement

- Suggest reusable tiffin partner restaurants

Waste & Recycling Log

♻️ EcoCycle Log

How it Works

Step 1 — Smart Expiry Alerts

Notifications at 7d $\rightarrow$ 3d $\rightarrow$ Expiry $\rightarrow$ 24h grace

Step 2 — Disposal Update

User must log final status:

♻️ Recycled (proof / no proof)

💧 Reused / Refilled

🌱 Compostable

🚮 Landfill

Step 3 — Eco Scoring

Outcome	Score
Recycled (proof)	+10
Recycled (no proof)	+3
💧 Reused / Refilled	+8

🌱 Composted   +6

🚮 Landfill   -5

❌ No update   -10 (auto)

⚠️ Suspicious behavior   Score locked

Other Features

📊 Leaderboard & Rewards

EcoRank

How It Works:

> Track user eco-score globally & locally

> Weekly & monthly leaderboard refresh

> Rewards for consistent performance

Output

> "You're Top 12% in your city this week!"

Improvement

> Tips to boost rank & unlock rewards

🌱 Community & Events

EcoCircle

How It Works

> Join local groups / schools / workplaces

> Attend cleanup drives, workshops, swaps

> Organisations earn points as well

Output

> "Your community earned +240 points this month"

Improvement

> Invite members to grow influence

🚨 Unusual Waste Reports

EcoAlert

How It Works

> Users report illegal dumps / unusual waste
>
> Photo upload → verification required
>
> Points or badges if verified

Output

> "Report Verified → +35 EcoPoints"

Improvement

> Guides: how to report responsibly

🥇 Monthly Achievement Badges

EcoBadge

How It Works

> Auto-assign badges based on metrics
>
> Categories: Reuse Hero / Zero Waste Week / Local Shopper / Consistent Logger

Output

> "🥇 You earned Local Shopper for 72% local purchases"

Improvement

> Challenges to unlock next tier

⏰ Daily Habit Reminders

EcoNudge

How It Works

> Custom reminders for scans, disposals, expiry logs
>
> Smart suggestions based on patterns

Output

"2 items expire in 2 days — update disposal plan?"

Improvement

Habit streak rewards

🛒 Eco-Friendly Product Recommendations

EcoShop

How It Works

Suggest green alternatives based on purchase history

Partnered brands (marketing-friendly)

Refill stations / compostables / local shops

Output

"Switch to refill packs → save 1.1kg CO_2e/month"

Improvement

Cashback / discounts from partners

TECH STACK

Layer	Tech
Framework	React Native (Expo)
UI	React Native Paper / Tailwind RN
Camera & Barcode	Expo Barcode Scanner
Navigation	React Navigation
State Mgmt	Zustand / Redux Toolkit

🧠 Backend

Component	Tech
Core Framework	Django + DRF
API Gateway / Edge	Cloudflare Workers

Database	Insforge PostgreSQL
Auth	Django Auth + JWT + Insforge Integration
Media / Files	Cloudflare R2
Scheduled Tasks	Cloudflare Cron + Celery
Hosting	DigitalOcean or Railway

☁️ Cloud & Infrastructure

Purpose	Service
App Build & Deployment	Expo EAS / Play Store
CDN/Networking	Cloudflare
AI Planning	Kiro
Debug & API Testing	Requestly
Auth/Permissions	Insforge + Django JWT