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DOMAIN:
WEB 3.0 & BLOCKCHAIN

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PROBLEM STATEMENT

In **2024**, energy-related carbon dioxide emissions hit a record high, **reaching 37.8 gigatonnes** (Gt CO_2) and continue to rise. Carbon emissions have reached **unprecedented** levels, demanding urgent action toward climate neutrality. However, current carbon credit markets suffer from **lack of transparency**, **double counting**, and **slow manual verification processes.** These inefficiencies lead to **reduced trust and discourage participation** from businesses and individuals. The absence of engaging incentives further limits widespread adoption of carbon offset programs.

ABSTRACT

Carbon emissions are at **record highs**, yet current carbon credit markets **lack transparency**, suffer from **double counting**, and rely on **slow manual verification**. Our Blockchain-Powered Carbon Credit Marketplace solves this by using **Ethereum** smart contracts to **automate issuance**, **verification**, **trading**, and **retirement of tokenized credits**. Integrated with verified environmental project APIs, it ensures **authenticity**, and **immutable records**, making carbon trading secure, transparent, and engaging.

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INTRODUCTION

- This project is a **Blockchain-Powered Carbon Credit Marketplace** designed to make carbon offset trading **transparent, secure, and efficient**.
- Built on **Ethereum**, it tokenizes carbon credits to ensure traceable ownership, eliminates **double counting, and automates issuance, verification**, and retirement through smart contracts.
- The platform integrates with **verified environmental project APIs**, enabling real-time credit authenticity checks. With a **user-friendly interface, blockchain-backed trust, and decentralized architecture**, it empowers businesses and individuals to actively participate in global climate neutrality efforts.

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PROPOSED SOLUTION

- We propose a **Blockchain-Powered Carbon Credit Marketplace** - a decentralized platform built on **Ethereum** that enables stakeholders to **track, buy, and sell carbon credits** with full transparency.
- The system uses tokenized carbon credits for **secure and traceable ownership**, while smart contracts **automate issuance**, **verification**, **trading**, and **retirement** of credits.
- By integrating APIs from verified environmental projects, the platform ensures **authenticity** and **prevents fraud**. Additionally, it keeps users informed, making sustainability both transparent and engaging.

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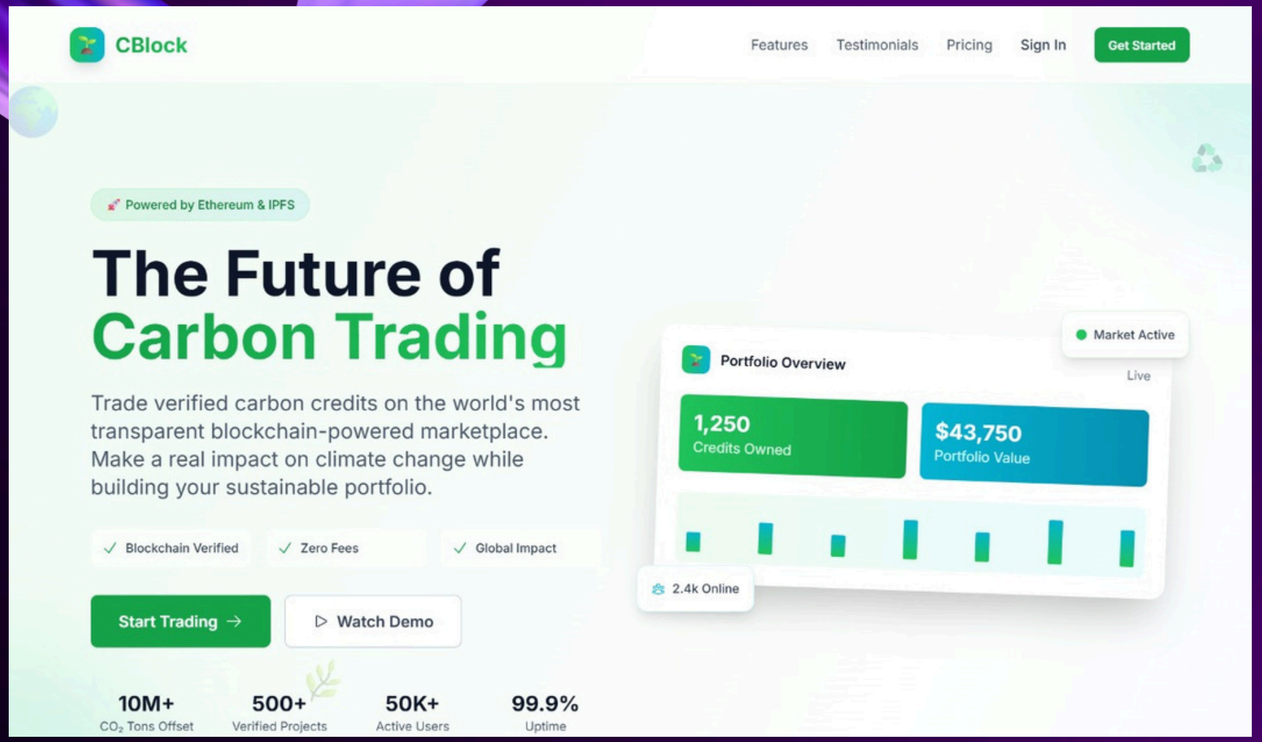
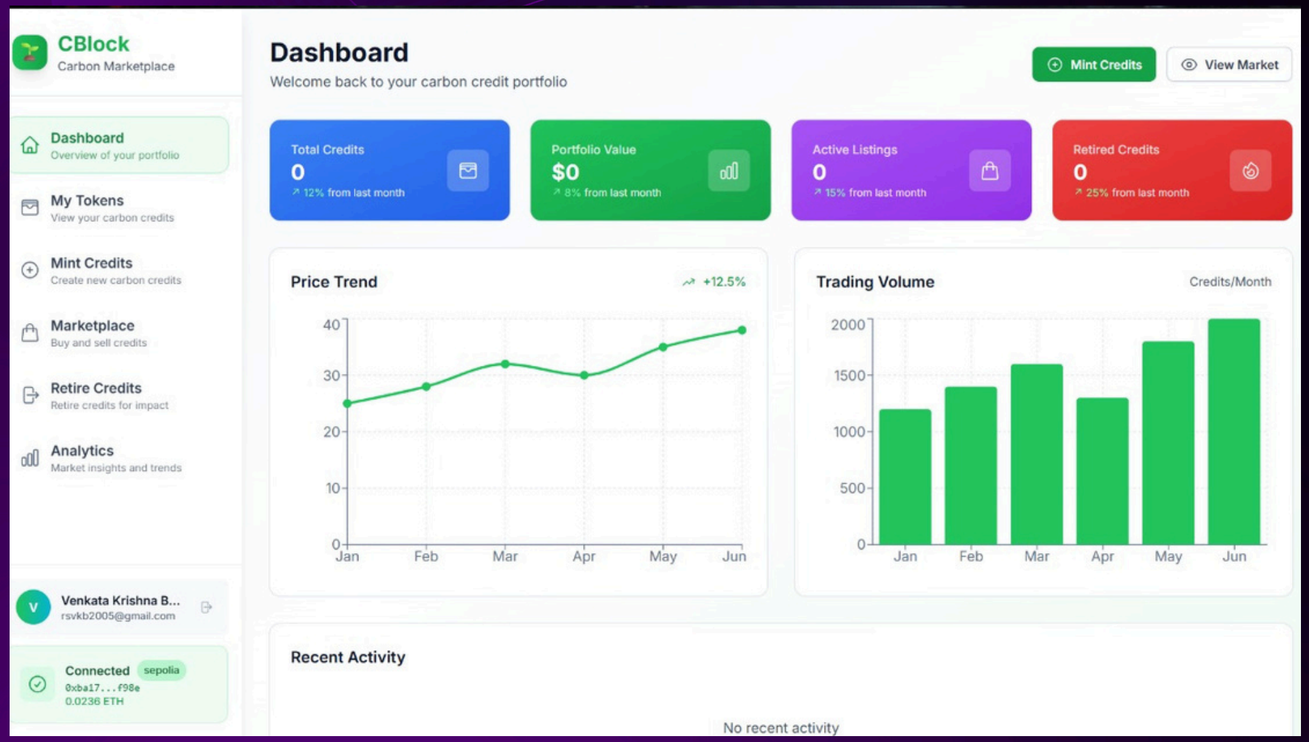
PROPOSED SOLUTION





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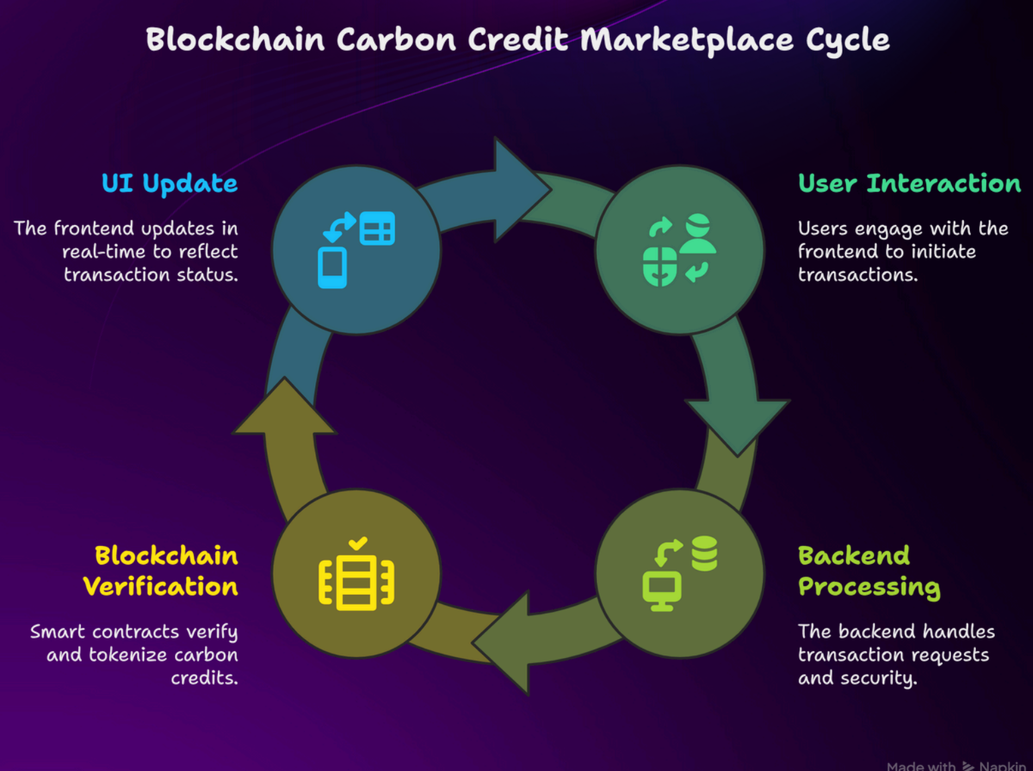
IMPLEMENTATION

1. **User Interaction**
   - Users connect their wallet and start transactions via the frontend.
   - The request is sent to the backend for processing.
2. **Backend Processing**
   - Node.js backend validates and secures the transaction request.
   - It forwards the request to the Ethereum blockchain.
3. **Blockchain Verification**
   - Smart contracts verify and tokenize the carbon credits.
   - Blockchain sends transaction results back to the backend.
4. **UI Update**
   - Frontend updates instantly with the transaction status.
   - Users see real-time confirmation or error messages.



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KEY FEATURES

FEATURE 1

Blockchain-Verified Company Login via MetaMask: Companies securely log in using **MetaMask**, with identity verification done on-chain for trust and transparency.

FEATURE 2

IPFS-Based Data Storage with Carbon Credit Tracking: All environmental action data is stored on **IPFS (via Pinata)** with a **unique CID**, enabling proof of activity and real-time carbon credit allocation, trading, and retirement on the blockchain.

Impacts & Benefits

Eliminates fraud and double counting.	01	**Integrity** Ensures trustworthy and transparent markets.
Reduces verification time from weeks to minutes.	02	**Efficiency** Speeds up processes, enabling quicker project execution.
Builds trust and boosts participation.	03	**Engagement** Inspires active participation from all stakeholders.
Enables global accessibility for all users.	04	**Inclusivity** Opens access to anyone with internet connectivity.
Supports global climate neutrality goals	05	**Sustainability** Accelerates progress toward climate neutrality.

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BUSINESS MODEL

Expenses

Recurring Payment Gateway Fees: ₹25,000/year

One-Time Server & Hosting: ₹1,00,000

Annual Revenue (Transaction Fee Only)

Credit Price: ₹650
Transaction Fee: 2% → ₹13 per transaction
Transactions/year: 3,500 users × 10 **Transactions =** 45,500 transactions
Total Revenue: ₹13 × 45,500 = ₹4,55,000

Profit Calculation

First Year (with one-time server cost):

₹4,55,000 − (₹25,000 + ₹1,00,000) = ₹3,30,000 profit

From Second Year Onwards (no server cost):
₹4,55,000 − ₹25,000 = ₹4,30,000 profit

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NOVELTY

- Transform carbon credits into **secure, blockchain-backed digital tokens** for easy trade.
- Fully automate the carbon credit lifecycle - from **issuance to retirement** without manual delays.
- Deliver **instant, verifiable proof** of every offset's real-world impact.
- Enable seamless cross-border transactions in a unified, globally accessible marketplace.

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TECH STACK

Frontend

- Developed using **React.js** for a dynamic and interactive user experience.
- Styled with **Tailwind CSS** to ensure a fully responsive and mobile-friendly design.
- Integrated **crypto wallet** connectivity for seamless user transactions.

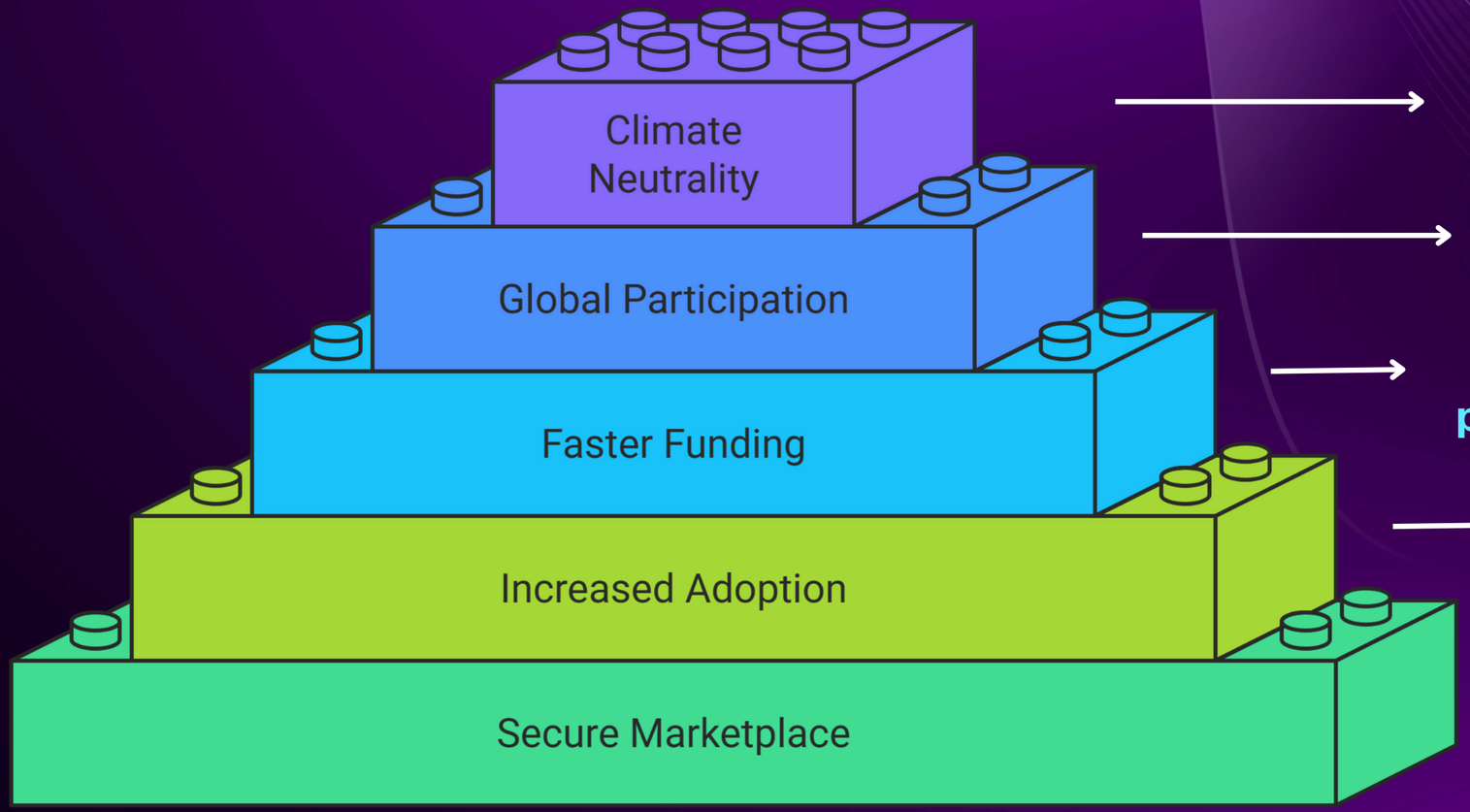
Blockchain

- **Ethereum** smart contracts used to tokenize carbon credits into verifiable digital assets.
- **On-chain verification** for real-time tracking of credit ownership and transactions.

Backend

- Built on **Node.js** for fast, scalable server-side operations.
- Handles **secure API calls** between the frontend and blockchain network.

RESULT



Enables measurable carbon offsetting, accelerating the journey to net-zero.

Open, borderless access for verified users worldwide.

Peer-to-peer transactions speed up payments to verified environmental projects.

Easy onboarding via MetaMask and intuitive UI drives participation from businesses and individuals.

Decentralized platform ensuring fraud-proof, transparent carbon credit transactions.

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Thank you

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